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ABSTRACT

This document contains the following papers on international issues from the SITE (Society for Information Technology & Teacher Education) 2001 conference: (1) "Attitudes of Malaysian Vocational Trainee Teachers towards the Integration of Computer in Teaching" (Ab. Rahim Bakar and Shamsiah Mohamed); (2) "Views from an Asian Bridge: How International Students See Us and Still Survive" (Richard Cornell and others); (3) "Creating Virtual Learning Communities in Africa: Issues and Challenges" (Osei K. Darkwa); (4) "ICTs for Learning: An International Perspective on the Irish Initiative" (Eileen Freeman and others); (5) "An In-Service Program in Applied Linguistics for Language Teachers" (Diana Jenkins and others); (6) "Virtual Exchange Program: Coming to a Computer Near You?" (Chris Junghans); (7) "An Overview of Information Technology on K-12 Education in Taiwan" (Greg Lee and Cheng-Chih Wu); (8) "Findings from the Project for the Longitudinal Assessment of New Information Technologies (PLANIT): 2000-2001" (Cesar Morales and others); (9) "Evaluation of the Girls Research Opportunities in Computing (Girls R.O.C.)" (A. Dale Mangoun and Charlotte H. Owens); (10) "Teacher and Student Attitudes toward Computers, 1999-2000: Findings from a Suburban Texas School District" (Gerald Knezek and Rhonda Christensen); (11) "Teachers and Students' Attitudes toward Computers in Mexico: Results of Phase 2000" (Cesareo Morales); (12) "Preservice Teachers' Attitudes toward Information Technology in Brunei" (Mint Swe Khine); (13) "Findings from Thailand for the Longitudinal Assessment of New Information Technologies" (Nanta Palitawanont); (14) "Multimedia in Chinese Elementary Schools" (John Ronghua Ouyang and James E. Yao); (15) "An Instrument To Measure Malaysian Teachers' IT Preparedness" (Wong Su Luan and others); (16) "An In-Service Program for Ecuadorian Teachers. The Innovation of Elementary Education in the Santa Elena Peninsula Project" (Martin Valcke and Katherine M. Chiluiza); and (17) "Critical Kiwi Chronicles: Technology and Teacher Education in New Zealand" (Cameron White). An abstract of the following paper is also included: "An Introductory Internet Skills Program for Teacher Education: Or from Practice to Theory: A Case Study" (Cameron Richards and Mita Bhattacharya). Most papers contain references. (MES)

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ED 457 830

INTERNATIONAL

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Each year I look forward to the international proposals and then later to the papers sent, now electronically, from around the world. Initially any paper from outside the United States found its way into this section, but each year as we became more and more an international organization, as STATE became SITE, we looked for papers that told of IT in teacher education across national boundaries. Every year I have enjoyed a 'world tour' of IT and teacher education, marveling at the fascinating differences and the wonderful commonalties that we share. This year's annual sees a change in format due to the large number of accepted proposals and the quick turnaround time. All of the papers within each section are listed alphabetically by lead author; however, section leaders have been encouraged to address them in logical groups, providing a 'mental' arrangement no longer possible in book form.

There are a number of papers this year that exemplify *multinational perspectives* and I have grouped them accordingly. Another packet of papers provide us *with virtual windows* on IT within individual countries. Several articles focus of IT with specific types of teachers. Finally, two papers address, to some extent, a more *people-to-people* view.

Multinational perspectives

Five papers represent the findings of panel members from the Project for the Longitudinal Assessment of New Information Technologies (PLANIT): 2000-2001, and should be read with this in mind. These researchers have gathered data about the impact of information technology on teachers and learners using a common set of instruments. *Magoun and Owens*, University of Louisiana-Monroe, USA, evaluate a project in Louisiana involving girls in research opportunities in computing. *Knesek and Christensen*, University of North Texas, USA, examine teacher and student attitudes toward computers in a suburban Texas school district. *Morales*, Institute of Latin American States for Education, Mexico, reports a similar study among students and teachers in the Mexico City area that marks a three-year Mexican contribution to PLANIT. *Khine*, University of Brunei, Darussalam, looks specifically at preservice teachers' attitudes toward IT in Brunei, noting an interesting variation between home computer owners/users and those without, those without being more positive in the impact on student learning. *Palitawanont*, Burapha University, Thailand, explores attitudes in Thailand of students, teachers, and university faculties.

While the papers mentioned above spanned locations around the globe, the work of *Darkwa*, University of Illinois Chicago, focuses primarily on one very large continent, Africa, and the issues and challenges of creating virtual learning communities in incredibly diverse and difficult situations. Suggestions are given for overcoming the challenges confronting technology-based education in Africa.

Freeman, Holmes & Tangney, Trinity College Dublin, report on the curriculum, assessment and the use of ICT as tools to reshape learning in Finland and Sweden. The authors emphasize how Ireland could benefit from following the examples provided by these Scandinavian countries. The authors also provide a rich list of references, the majority accessible via web sites.

The next paper spans the Atlantic reporting on a collaborative effort by a South African University and an American University. The authors, *Kagima and Zayed*, University, United Arab Emirates, *Thompson and Phye*, Iowa State University, USA; and *Van Wyk*, University of Stellenbosch, South Africa, describe a project designed to enhance faculty capacity to meet a number of growing needs including the challenges of providing higher education to in-service teachers and practitioners.

Virtual windows on IT

The first two papers I recommend in this subsection examine IT inservice programs in the Western Hemisphere. *Valcke*, University of Ghent, Belgium, *and Chiluiza*, Escuela Superior Politecnica del Litoral, Ecuador, report on part of a six-year project to improve Ecuadorian elementary education. A sub-project focused

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on the analysis of video materials and surveys that research the current dominant teaching - learning strategies adopted and promoted by teachers in the project. The second of these papers is authored by *Jenkins, Gilbón, and Contijoch,* National Autonomous Univ. of Mexico, Mexico. They explore the challenges language teachers now encounter and describe a project designed to address these needs through a model which combines the applied linguistic content with experience in the use of educational technology.

The next paper provides a critical analysis of the integration of technology in pre-service teacher education in New Zealand. *White,* University of Houston, USA notes while the country has made great strides there is a continuing issue of professional development of teachers and actual application of technology in the schools.

Chinese teachers have made an impressive progress in using multimedia in their classrooms, reports *Ouyang,* Kennesaw State University, USA, *and Yao,* Texas A&M University-Commerce, USA. These teachers participate in training to enrich their own technological skills, and utilize multimedia to improve teaching and learning.

Two articles examine IT in Malaysia. The first, by *Luan, Bakar, Tarmizi, and Hamzah,* Universiti Putra, Malaysia, describe the development of a group of assessment tools to evaluate teachers' IT preparedness in three domains: the teachers' actual IT skills, their knowledge about IT and their attitudes toward IT. They also describe what the instrument attempts to measure, how it is administered and present results of phases one and two of the study. The second paper, by *Bakar and Mohamed,* University Putra Malaysia, report a descriptive correlational study of vocational trainee teachers attitudes towards the integration of computers in teaching.

Lee and Wu, National Taiwan Normal University, Taiwan, provide us with an overview of IT in education in Taiwan, noting the dramatic increase in IT and the tremendous support given by the Ministry of Education of Taiwan.

People-to- People

In many ways the final two papers explore personal connections, one in a 'virtual exchange program' and the other in a real exchange, between international IT students and their hosts. A description of a "Virtual Exchange Program" is given by *Junghans,* Montana State University, suggesting this as a way to introduce an intercultural experience into the foreign language classroom that would directly stimulate and provide for an interest in contemporary German culture.

In the article, "Views from an Asian Bridge: How International Students See Us and Still Survive" *Cornell, Lee, Chang, Tsai, and Tao,* University of Central Florida, USA, *and Ku,* Arizona State University, describe the problems international students encountered and efforts being made to resolve them. While the setting of this last article is the US there are lessons are universal. Several in my family have studied in other countries, the UK and France, to be specific, and they had concerns and experiences not unlike those mentioned in this paper. Any student in a foreign land encounters similar problems and, one hopes, similar pleasures.

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Attitudes of Malaysian Vocational Trainee Teachers Towards the Integration of Computer in Teaching

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Abstract : This paper is a report of a study conducted to assess the attitudes of Malaysian vocational trainee teachers towards the integration of computer in teaching. One hundred and thirty trainee teachers participated in the study of whom 12.2% was male trainees and 87.8% was female trainees. They majored in agricultural science (13.7%), home science (17.3%), economics and accounting (22.3%), others (46.7%). Their minors areas were living skills (25.5%), business studies (70.5%), and economics (4.3%). In general, vocational trainee teachers had a positive attitudes towards the integration of computers in teaching. However, the attitudes towards the integration of computers in teaching did not differ among students with different majors and minors. Majority of them planned to integrate computers in teaching. A significant correlation was observed between their attitudes towards the integration of computers and their plan to integrate computers in teaching. They believed that all trainee teachers should be required to enroll in a computer class while in teacher training.

Introduction

Microcomputers has started to revolutionize the delivery of education in Malaysia when the Ministry of Education Malaysia initiated a computer in education pr- ject for Malaysian secondary in 1983. At that time twenty secondary schools were selected to participate in a pilot project called 'An Introduction to Computer' (Abdul Rahman Abdullah, 1986). The purpose was to equip students with basic knowledge of computers and it's applications. However during the 80's the integration of computer in the school curriculum was not as intensive as it was in the late 90's. During the late 90's the Government of Malaysia emphasized the importance and the role of information technology for national development. In fact, information technology has become a dominant feature of the National Policy. As emphasized in the Seventh Malaysian Plan, there will greater demand for workers with computer and information technology skills as a result of a greater use of information technology the operation of both government and non-government organizations. Preparation of workers with knowledge and skills in computerization begins in schools. Then only, computers became an important component of the school curriculum.

The Government is committed towards the use of computers in the delivery of education and as such a hefty sum of RM 12.5 billion was allocated to the educational sector in 1998. The large budget allocation was intended for the initiation of the infrastructures development and training needed to prepare students for the information age. Currently, many schools (both primary and secondary) has at least one computer with an access to the internet. To emphasize the seriousness of the Malaysian Government in preparing knowledge workers, the government through the Ministry of Education has embarked on the

project called SMART SCHOOL project whereby technology will be extensively used to support and enhance teaching-learning. The SMART SCHOOL project is aimed at re-inventing the teaching-learning process and promote creative and critical thinking among students through the extensive use of technology, the Internet and multimedia courseware. Currently, 90 schools have been transformed into SMART SCHOOL. The Ministry of Education Malaysia intends to have all it's 10,000 school in Malaysia to be renowned as SMART SCHOOL by the year 2010.

The excitement to integrate computers in education is not without basis. According to Roblyer, Castine, and King (1988), research findings have made it clear that computer applications have undeniable value and have an important instructional role to play in classrooms. Others (Bruner, Buchsbaum, Hill, & Orlando, 1992; O'Brien, 1991; Papert, 1993) have affirmed that computer technology provides abundant opportunities for students to build or modify their personal knowledge through the rich experiences that technology can afford. Computer technology has the capacity to affect the efficiency and productivity of education (Yang, H. H, Mohamed, D. & Beyerbach, B., 2000). In fact, Pelgrum and Plomp (1991) observed that there was a phenomenal infusion of information technology in school worldwide and Malaysia is no exception.

The success of the integration of computers in teaching depends partly on teachers' knowledge about computers, their skills in using computers and their attitudes towards the integration of the computers in their teaching. As Fouri and Gioia (1991) indicated, teacher's attitude towards computers influences teacher's willingness to use computers a s a professional tool or the introduction of computer applications into the classroom. Woodrow (1992) also stated that positive teacher attitudes toward computers are widely recognized as a necessary condition for effective use of information technology in the classroom. The question is 'What is the attitude of Malaysian vocational trainee teachers towards the integration of computers in teaching?' The answer to this question is needed if the integration of computer in Malaysian school is to be successful.

Objectives of the study

The objectives of the study was to assess the UPM vocational trainee teachers attitudes towards the integration of computer in teaching. The study also attempted to examine the relationships between trainee teachers attitudes towards the integration of computers in teaching with several selected variables such as: (a) level of confidence, (b) level of knowledge about computers, (c) interest towards computers, (d) whether or not they have their own computers, and (e) do they plan to integrate computers in their teaching.

Methods

The present research employed a descriptive correlation research methodology. Two hundred vocational trainee teachers who underwent a 12 weeks teacher training program were mailed the research instrument. They were requested to return the completed instrument within two weeks period. One hundred and thirty-nine completed questionnaires were returned giving a response rate of 69.5%.

The research instrument used to solicit the needed information consisted of attitudes items, one question each on gender, major and minor areas of study, academic achievement, interest towards the integration of computers in teaching, level of confidence and knowledge about computers. Trainee teachers attitudes towards the integration of computers in teaching was assessed using a 5-point Likert Scale (5=strongly agree; 4 = agree; 3=moderately agree; disagree; 1=strongly disagree) Originally, the measure consisted of 36 items. However, based on the pilot test results 5 items were eliminated. The final questionnaire consisted of 31 attitudes statements. The 5 items were eliminated because of either the statements have near zero correlations or negative correlations. According to Mueller (1986), items that have near zero correlations negative correlations should be eliminated form the scale. These items did not contribute to the variance in the attitudes towards the integration of computers in teaching. An analysis of the responses from 30 trainee teachers who did not participate in the study yielded a reliability coefficient of 0.90 for the attitudes scale.

Results

A total of 139 trainee teachers responded to the survey. The respondents consisted of 12.2 % male and 87.8 % female trainee teachers. Their major areas of study were agricultural science (13.7%), home science (17.3%), guidance and counseling (23.0%), Malay language (15.1%), economics and accounting (22.3%), science and mathematics (8.6%). Their choice of minors were living skills (25.5%), business studies (70.5%), economics (4.3%). Their academic achievement as measured by grade-point average ranged between 2.00 and 3.74 with a mean of 2.91 (sd.=.41). Some of the respondents have used computers for more than 10 years while some have just started to use computers about two years ago. On the average trainee teachers have been using computers for about 5.2 years with a standard deviation of 2.73 years. About one-half of the trainees (53.2%) own a computer.

The study showed that trainee teachers were not very confident in using computers (mean=3.71 on a scale of 1-5, sd.=.55). They had quite a low level of knowledge about computers (mean=3.47 on a scale of 1-5, sd.=.57). They had quite a high level of interest in using computers (mean=4.12 on a scale of 1-5, sd.=1.01). majority of the respondents planned to integrate computers in their teachings (93.5%). All of them believed that a trainee teacher should be exposed to a computer course while in training. The study also found that 61.20 % the respondents had taken computer classes beside the computer classes offered by the Faculty of Education, UPM. The study showed that 59% of the respondents did not enroll in a computer course offered by the Faculty of Education, UPM.

Vocational trainee teachers attitudes' towards the integration of computers in teaching was assessed using a questionnaire consisting of 31 attitudinal statements. The total score obtained by the respondents ranged between 89 and 145. The total scale mean was 103.8 (sd.=8.36). The median was 104 and the mode was 105. The items mean was 3.95 on a scale of 1-5 (sd.=.33). In general, trainee teachers tended to agree with most of the statements. Fourteen statements (45.0%) had a score of 4.0 and above, 12 statements (38.7%) had a score between 3.5 and 3.9 and eight statements (16.3%) had a score between 3.0 and 3.49 (Table 1).

Table 1: Means and sd. of vocational trainee teachers attitudes towards the integration of computer technology in teaching (n=139)
(Scale: 1=strongly disagree, 2=disagree, 3=moderately disagree, 4=agree, 5=strongly agree)

Statement of attitudes towards the integration of computer in teaching	Mean	Sd.
I have confidence when talking about computers with my friends	3.38	.82
I am interested to enroll in computer in education courses	4.51	.77
The use of computer in education does not make me nervous	3.75	1.1
Using computer in teaching does not complicate a teacher's job	3.91	1.0
I have the ability to use computer in teaching	3.87	.73
I am knowledgeable about computerization in education	3.23	.75
I have the confidence when using computers for teaching	3.78	.66
I have the skills to use computers in teaching	3.44	.79
It is not difficult for me to use computer in teaching	3.72	1.0
I am knowledgeable about computer some programs	3.81	.75
I like to discuss with friends about computer in education	3.87	.71
I like to use computer in teaching	4.02	.71
Integrating computer technology in teaching is interesting	4.22	.71
It is difficult for me to stop once I start using computer	4.64	.86
If I have problem in using computers, I will seek helps from others	4.48	.66
Using computers in teaching will increase students' motivation	4.34	.68
Using computers in teaching improves teaching effectiveness	4.22	.61
Using computers in teaching will make learning more effective	4.26	.67
Using computers in teaching will enable teachers to teach a difficult to understand concepts more easily	3.87	.77
There is not much a problem in using computers in teaching	3.58	.92
Using computers in teaching will give time for teachers to help academically poor	3.44	.86

students		
Using computer in teaching encourages students' creativity	4.23	.67
Using computers in teaching gives opportunity for good students to excel in their studies	4.34	.56
Using computers in teaching makes students enjoy learning	3.86	.94
Using computers in teaching increase students' self-confident	4.03	.64
Using computers in teaching improve students' academic performance	3.93	.69
Using computers in teaching increases students' knowledge	4.25	.59
Using computers in teaching enable students to get information faster	4.24	.64
Using computers in teaching increases students' interests in subject-matter	4.21	.66
Using computers in teaching makes learning mechanical	3.81	.79
Using computers in teaching does not bore me	4.09	.94

Item means=3.95, sd.=.33
Scale mean=103.8, sd.=8.36

A correlation analysis was conducted to determine if any relationship between trainee teachers attitudes towards the integration of computers in teaching and selected independent variables existed. Low significant correlations were found between trainee teachers attitudes and their level of knowledge about computers ($r=.21$, $p<.05$); level of confidence ($r=.20$, $p<.05$); and their intention to integrate computers in teaching ($r_{pb}=.20$, $p<.05$). No significant correlations were found between the attitudes towards the integration of computers and whether or not the trainees own a computer, the number of years they have been using computers, and their interests towards computers. A One-way ANOVA test was performed to determine if there was any difference of attitude among students of different majors. It was found that attitude towards the integration of computer in teaching did not differ among trainees of different majors ($F_{(6,138)} = 1.902$, $p > .05$) and among trainees with different minors ($F_{(2,134)} = .174$, $p>.05$). The study also showed that attitudes towards the integration of computer technology in teaching did not differ ($t_{(136)} = -.31$, $p>.05$) among students who have or have not taken a computer course offered by the Faculty of Education, UPM (mean=118.9, sd.=10.22; 118.3, sd.=11.79, respectively).

Conclusion

The following conclusion can be drawn from the study:

1. The study has shown that in general vocational trainee teachers had a positive attitudes towards the integration of computers in teaching. Thirty-three percents of the respondents obtained a score of 125 and above. They can be classified as having positive attitudes towards the integration of computers in teaching. About 60% of the respondents obtained a score between 96 and 124. They can be classified as having a moderately positive attitudes towards the integration of computers in teaching.

2. The vocational trainee teachers do not have a high level of knowledge about computers. Their level of knowledge about computers is about average (mean=3.47). A significant correlation was found between their attitudes towards the integration of computers in teaching and their level of knowledge about computers.

3. The vocational trainee teachers were not very confident in using computer (mean=3.71). A significant correlation was found between their attitudes towards the integration of computers in teaching and their level of confidence in using computers.

4. The vocational trainee teachers had a high level of interest towards computer technology (mean=4.12). However, no significant correlation was found between their attitudes towards the integration of computers in teaching and their level of interest towards computers.

5. The trainee teachers believed that all trainee teachers should have been exposed to a computer course.

6. The attitudes towards the integration of computers in teaching did not differ among students of different majors and also among students of different minors.

7. The majority of the trainees planned to integrate computer technology in their teaching.

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Views from an Asian Bridge
How International Students See Us and Still Survive

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Andy Ku, Arizona State University
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Sam Pan Chang, UCF
Michael Tsai, UCF
Terry Tao, UCF

Abstract: Increasing numbers of international students are entering the graduate programs in the area of Instructional Technology at the University of Central Florida. With this influx comes a series of communications and miscommunications between American faculty, staff, and students with their Asian and other international peers. This article and presentation describe the problems encountered and efforts being made to resolve them. It is our hope that other faculty, staff and students from North America will benefit from our experiences.

The Problem

Faculty and staff at our universities require a substantial amount of information to adequately advise international students who wish to enter instructional technology graduate programs. We choose instructional technology because this is the area in which we work. We feel that, within our field, members share a common bond that is unique, and this sharing needs to be passed on to any and all who might be able to assist our future and current students from abroad.

Like many of our academic peers, we encounter a range of experience among our faculty in advisement of new international students when they are studying with us. While some of this deficit rests with routine logistics involved with assisting international students, i.e., knowing details related to immigration, course load requirements, and related visa status, other elements present themselves in more unique ways.

A survey of faculty and staff in many programs reveals a lack the background and knowledge required to properly assist our international students.

A telephone and face-to-face series of interviews was conducted during May 2000, among fifty faculty members at the University of Central Florida (UCF) across all five colleges, to determine the extent to which they had previous international experience (Cornell, 2000).

In addition, during an International Studies Summer Workshop, also at the University of Central Florida, a 14-point questionnaire was given to over 100 faculty members related to faculty perceptions of international issues.

The findings obtained during both surveys revealed a wide and disparate diversity of attitudes, initiatives, and previous international experience, as might be expected from most academic institutions. Given that our institution has a strong international focus reflected in its strategic plan, these concerns were of interest to those of us who emphasize international outreach in the recruitment and retention of such students.

The telephone and face-to-face interviews asked respondents:

> Do you have a valid passport?
> When and where was your last trip abroad?
> Have you had international students in your classes in the past?
> Do you currently have international students in class?
> Do you know the current status of your international students' I-20?
> Do you know the visa designation of your current international students?
> Are international students enrolled in your academic program major?
> If so, how did they find out about your program?
> If so, what information and services did you provide or arrange on behalf of your international student, before, during, and after completion of their program?

Questions in the second questionnaire (2000, Office of International Studies) asked faculty:

> To what extent are you conscious of cultural differences among your students?
> To what degree do you encourage diverse values?
> What initiatives do you take in dispelling prejudices, stereotypes and misconceptions among students?
> Do you recognize your own cultural biases?

What measures do you take to insure that your own prejudices or stereotyped thinking influences expectations from your students?
To what degree do you encourage students' mutual respect and open communications?
Do you search for ways to overcome student reluctance to recognize and discuss cultural/ethnic questions?
To what degree do you adjust your own teaching methodologies with students from differing cultures?
Do you demonstrate that academic expectations are equal for all students, regardless of cultural background?
Do you encourage the formation of cooperative learning groups that reflect diverse cultural and academic performance levels?
Do you include specific world areas and topics within your curricula?
To what extent do you keep up to date on issues and content related to world areas?
Do you feel that institutional resources related to international issues are adequate to meet your teaching needs?

Rather than dwell on the findings of these surveys, the aim of this paper and presentation is to accept the root cause of specific issues identified and to devise means through which they might be addressed. In this regard, we turned directly to our students and had them describe their own survival strategies while studying with us.

Using Maslow as our metaphor, we sought the advice of Dr. William G. "Bill" Huitt, Professor of Psychology and Counseling at Valdosta State University (Huitt, 2000). He generously provided us with a number of citations of his work and complete presentations related to Abraham Maslow and this provided us schemata or rubric upon which we placed our approach.

We took Maslow's Hierarchy as a framework and asked our students to move through it, step-by-step, while they considered their own presence with us. It is the impact of commentaries by our students that constitutes the majority of this paper, for their voices, when heard by concerned faculty, staff, and fellow students, sing. Through these students, all of whom are Asian, we experienced their fear, anxiety, loneliness, isolation, and more. We also learned of their passions, their excitement, and joy of discovery. Together we present a quilt of numerous colors and textures.

It is our contention through this discussion, that the comments made, with some adaptation, may also be extrapolated to students from non-Asian nations, for such problems appears to us to be universal.

Physiological needs form the base of our model for it constitutes the first step along their path toward accommodation into our university culture. Neither this fundamental needs set nor those that follow necessarily lead to assimilation.

- **Food**

  What to eat? That posed a real challenge for our students. The immediate problem is to satisfy hunger pangs, and then to seek out sources of food that are as close as possible, to food consumed at home. Fortunately for students coming to Central Florida, there exists a wide variety of international cuisine from which to select, two of which are literally across the street from our campus. Such may not, however, exist among many of the smaller academic communities where international students might settle.

  For many of our newly arrived international students, their first trip to an American supermarket posed a mixture of confusion, awe, and disbelief that such a preponderance of selections was available to them. What to purchase and to what extent it resembled their customary dietary needs posed a dilemma for many. Of course, there was always the option of indulging in a hurried trip to one or more American fast food establishments, as many did, only to find several hours later that their digestive system went into open rebellion.

  Some of our new arrivals, accustomed to Asian cuisine, found limited availability of chop sticks, and had to conduct a rapid self-tutoring as to how to adapt to knives, forks, spoons, glassware, and only a single entrée.

  Fortunately, most students adopted conventional American ways of eating with minimal problems, often within twenty-four hours of their arrival. They also, and with equal speed, located a variety of ethnically compatible sources of nourishment and continue to patronize such establishments with joy.

- **Shelter**

  Where will I live? That posed an immediate problem for our students. Our institution, like most in North America, has a well-established student residence office. There are a wide variety of choices for graduate students, most of which are adjacent to our main campus. This, however, is of little comfort when one walks off the plane after having flown twenty-four hours or more and the ravages of jet lag render them nearly immobile.

Typically, our arriving students have established contact with others from their country, and we hope one or more such contacts are there to meet them as they walk off the plane. In some instances, individual faculty members provide their new students with a few days of respite in their homes before the hunt for a new home has to begin.

Personally, I must admit that my own home has been functioning as a kind of international halfway house for some years now, and is likely to continue for some years to come. Not all faculty are as welcoming and, should no one be at the airport to meet a new students, problems can and do arise.

The immediate question raised by most is how far from the University will I be? The second question relates to how to get from their new home or apartment to campus, thus opening yet another series of questions as to available transportation, costs of same, and the wisdom of buying one's own vehicle, be it a bicycle, moped, motorcycle, car or to simply take the bus or walk back and forth. All possibilities exist in and around most campuses but the questions posed are sure to arise soon after the student has recovered from their trip.

Clothing

What to bring? Often questions arise as to what type of clothing one will need, especially if one has come from a culture where specific dress conventions are followed. Islamic customs may pose unique problems for female students, as one example. Most students coming from one of the "Five Dragons" nations (Japan, Hong Kong, Singapore, South Korea, and Taiwan) increasingly wear Western clothing, much of it designer-label, so compatibility with North American standards is less and less problematic.

It was noted by the lead author, during a trip to China in December of 1999, that clothing styles among the younger citizens likewise reflects a Western motif.
Where to buy new or replacement clothing sooner or later poses a problem for some, depending on what the international student brings with him or her. In this regard it is important to communicate with the prospective arrival as to appropriate clothing to conform to existing weather patterns. What we would recommend to one of our students will differ considerably from that of a student about to arrive in Minneapolis or Boston.

Safety needs form the second tier of our hierarchy, once the more primal needs have been addressed. Typically, either before a student arrives or once they are at the university, questions arise, i.e., "Just how safe will I be in this new environment?" Given the plethora of American mass-media content delivered abroad, small wonder that so many unanswered questions are posed, questions that North Americans take for granted, having lived through many prior experiences.

CNN aside, and in deference to the influence of innumerable media epochs laden with blood and gore, our international students need reassurance that in most of America, life is reasonably tranquil. Our citizens do not sport six guns in holsters strapped to their legs, (some Western States being an exception), and that in reality, American life can be quite peaceful, routine, and to some, boring.

As with any new environment, common sense dictates that caution be taken when walking alone at night, when in some "less-chance" neighborhoods, and that yes, the police will be your friend unless you break our laws.

"Is my new home or apartment safe?" A common question with no simple reply. Even in the best of neighborhoods, theft and mayhem occur, and few can predict when such events will happen. Once more, common sense must prevail, and admonitions made regarding security of one's premises and person.

Once our students get into a familiar routine, and gain acquaintances, of both fellow nationals and of Americans, major concerns related to safety evaporate. This feeling may change should some untoward event take place so it is advisable to alert the students to avoid complacency lest they become vulnerable.

Belongingness and Love Needs

How can I belong? This question, while not always vocalized, remains foremost as this step of the hierarchy is encountered. Often a decision is made by the international student to either stay with my own kind or integrate. Because cultures other than ours differ greatly, there may appear to be reluctance for our international student to mix much with their American counterparts. This behavior may often be the result of natural shyness, homesickness, lack of English language skills, fear of being around those different from themselves, or a myriad of other scenarios.

Dating or Miss-dating?

It is not uncommon for our international students to experiment with dating American students, once they have overcome their initial discomfort with being in the new environment. On more than one occasion, hearts will be broken and

alliances severed. At other times, true and lasting relationships are formed, the bonds of which will last a lifetime. Marriage is often a goal for some of these students, and frequently the student will share such confidences, once a mutual trust has been established. It is here that the role of surrogate parent comes into play as well as the ability to discern if the intended relationship is mutual between the two parties and if the ultimate intent is one of love and affection or, as does happen, an expedient means through which to obtain a Green Card. Tact and empathy become valued attributes during such times and the question then becomes, "How much looking before I leap?"

Esteem needs entails more than being liked by others. It also address questions of self-worth, of feeling one is valued by others, and certainly, of beginning with valuing of self.
To we rather brash Americans, such reflections of ourselves seem second nature but to those from other cultures, indulgence in one's self is considered in poor taste. In these times of self-assertiveness, our emphasis on introspection, self-development, and need for esteem may appear strange to those from abroad.

The need to know and understand follows in our model and presents its own set of questions. These issues are not solely the purview of international students as their American counterparts voice similar concerns. Among them are:

How do I know I know something?

What should I know and how to learn it?

"Knowing" not – to "Understanding"

Acting on what I both know and understand.

Aesthetic needs begins the climb from more fundamental needs to those wherein the quality of life begins to emerge as being of importance. Some of our international students bring with them a finely tuned sense of aesthetics while others may ask, "Who needs them?"

Once the international student fee s comfortable in immersing himself or herself into the mainstream of American academic life, both social and professional interests rise and decisions are made as to concerts vs. football, plays vs. parties, and inter-cultural collaboration. The question then becomes one of achieving a balance.

Self-actualization moves our model components up closer to the pinnacle and the major issue here is have I reached this level? How do I know? How do I know the "real" me? Do others know the "real" you? What are my next steps?

Transcendence is the true shining beacon of both Bill Huitt and Abraham Maslow, to say nothing of Mother Teresa. It is Nirvana for some, unachievable for many, and beyond the imaginations of most. It is the spiritual counterpart of being a mental giant yet, if applied with reason and care, maintains the qualities of caring, empathy, and more.
Our international students may have already reached such a deified state and we would be unaware of it, because we are often unaware of them where they really are.

Faculty and Staff Role

There are many things faculty and staff can do to enhance the experience for our international students. Consider these experiences opportunities for mutual growth as you consider their impact.

Expectations of both faculty and their international students will vary but it is worth noting that:

> My expectations of the man may say more about me than about him.
> What I expect depends upon where I come from and the meanings I give to
> what I experience. Expectations occur on many different levels, from concrete,
> explicit levels to implicit and subconscious ones. When the expectations of who we are communicating with meet our own, there is mutuality of meaning (1998,
> Trompenaars and Hampden-Turner, p. 21).

In searching for the author's meaning as quoted above, we need remain aware that:

International students may be scholars but may not be too adept at "life" skills.

Clarification is critical - what international students "know" may be inaccurate.

Referral to other agencies and sources is invaluable.

Mentoring becomes memorable.

To facilitate transitions from homeland to North America a number of logistics items are worth noting.

Before a student arrives there remain innumerable questions unanswered and often it is the faculty member who can and does supply the answers. The questions may relate to programmatic and/or personal issues that need resolution.

Legal stuff involves providing assistance in applying, advising how to properly complete an I-20 application, clarification of various visa types such as F-1, J-1, H-1, how to obtain assistantships, tuition waivers, etc.

Conventional wisdom says that the American Embassies and/or Consulates, and the University's International Student Office should provide the most accurate help in navigating these legal waters but in truth, small yet critical items frequently are omitted.

Personal stuff may be supposedly simple as advising the international student about what to bring, what to leave behind, and what items might be sent later. Keep in mind that the international student has very little understanding of what they will need in North America and what items might best be left at home.

Arranging housing should be done in concert with the University's Office of Student Housing, as most such offices will have the latest information as to availability, price range, and suitability. This is important information to have but equally important is that the housing located be in harmony with the international student's needs, and this is difficult for a busy housing office to determine.

When a student arrives involves assuring the student that someone will be there to meet, greet, and assist them in settling in. As was previously mentioned, if there is sufficient room in a faculty member's home for a day or two, such a welcoming is never forgotten.

While they are entrusted in your care relates to what happens when they have settled in and are ready to come to the faculty member for advisement in the program. Care must be taken not to overwhelm the new international student, as their previous academic system may be totally different from the one in North America. Everything is new and everything is confusing.

Insuring that legal and financial affairs are addressed is most likely the task of the admissions office and the International Student Services Office but faculty should be alert to the many nuances involved in seeing that all papers are legally in order. Doing so protects both the institution and the student.

Making international students part of the technology studies "family" can be extremely rewarding for the international student. Consider that they have left their own families and friends behind, know very few people upon arrival, and this leaves only the students with whom they will be taking classes.

It is advisable to assign a peer mentor for the newcomer who can assist the student in transitioning from past to present. It is our feeling that, where possible, the peer mentor should be someone from the same geographic area from which the student comes. If not, then the peer mentor should be someone who has traveled abroad, and can thus empathize as to how being alone in another country feels.

Helping overcome difficulties that arise can be an issue, especially if the faculty member has no prior experience in dealing with international issues and concerns. The more the faculty member knows about the culture and customs of the new student's country the better.

- **Upon their departure** and the student has completed their academic program with you, the story has not ended. In fact, it is most likely just beginning for, if your student has met with success, it is the beginning of a lifelong relationship. Often such relationships lead to visits abroad to the student's home country or exchanges of faculty between his or her institution and yours or the infusion of many more students from that nation. Our field of instructional technology is close-knit and long lasting.

Summary

Maslow's Hierarchy served us well as a suitable rubric upon which to place our discussion and, in doing so; it has allowed us to see our students as they see us. Beyond all doubt, faculty, students and staff benefit equally. While the context of this article relates to those who come to us from overseas, what is true for our international students is true for ALL our students.

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Creating Virtual Learning Communities in Africa: Issues and Challenges

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This paper discusses the growing application of information communications technologies in Africa and other parts of the world. It examines the growing global information technology revolution and how it is transforming educational institutions. It then discusses the state of distance education in Africa, identifying the institutions offering distance education and the nature of the delivery platform used. The prospects and challenges in introducing distance education to tertiary institutions in Africa is discussed. Finally, it offers suggestions to overcome the challenges confronting technology-based education in Africa.

Introduction and background

The new information revolution has enabled academic institutions to provide a flexible and more open learning environment for students. The convergence of new information technologies such as telecommunications, computers, satellites and fiber optic technologies is making it easier for institutions to implement distance education (Harasim, 1993). Indications are that distance education in higher education will continue to grow (Hanna, 1998; National Center for Education Statistics, 1998; Rahm & Reed, 1998; Roberts, 1996). Over the past few years, the World Wide Web (WWW) or Information Superhighway has emerged as a locus of innovative instructional modalities in higher education (Patterson & Yaffe, 1994).

Higher education in Africa is facing a critical challenge to meet new demands for the 21st century. Africa has a population growth rate of 2.3%. This means that those seeking access to education at all levels-primary, secondary, and tertiary will increase. In spite of this fact, educational institutions in Africa are not expanding enough to accommodate the increasing number of students seeking access to higher education. Africa needs a kind of education that would make it more responsive to challenges confronting the continent. Until such time as tertiary institutions in Africa have the resources for their own expanded traditional tertiary institutions, it would be in the interest of the continent if alternative ways of providing access to higher education via distance education is explored. Distance education makes it possible for students anywhere who have Internet and Web connection to enroll in on-line courses.

Even though the application and use of information technology in education in Sub-Saharan African has been severely underutilized, over the past few years, Africa has seen a tremendous growth in the use of technology on the continent. The past few years have seen pioneering efforts in a number of African countries to apply information technology to higher education. Among the countries are Botswana, Madagascar, Namibia, South Africa, Tanzania, and Zimbabwe. Countries such as Cote d'Ivoire, Togo, and Congo are joining the distance education bandwagon by establishing pilot virtual programs.

Distance education could be used to make it possible for African secondary school graduates, only a fraction of whom can be accommodated in African tertiary institutions, to enroll directly, and without leaving their homes, in on-line colleges and universities on the continent and around the world. Such form of education offers several advantages over the traditional educational system. Among them a) virtual access to faculty in higher institutions around the world, b) introduction of new interactive pedagogical techniques (e.g., more hands-on learning opportunities, etc); and c) the linking of institutions in cyberspace where resources could be shared by people and institutions in physically unconnected places.

But what are the prospects and challenges confronting African educators as they explore the power and applicability of new information systems to education. This paper addresses those challenges. First, it begins by discussing the growing global information technology revolution and how it is transforming educational institutions worldwide. It then discusses the state of distance education in Africa, identifying the institutions offering distance education and the nature of the delivery platform used.

The Promise of Distance Education

Africa's educational institutions are confronted with several challenges; the challenge in training a cadre of highly qualified professionals to fuel development and address the challenges confronting the continent; the challenge of inadequate educational resources; brain drain and the loss of the best talented faculty to the outside world; the challenge of providing a more flexible educational system for students; and a host of other factors. Given the above challenges, it is highly unlikely that current educational institutions on the continent will be able to provide access and affordable education to all those seeking access. Even though tertiary institutions have a responsibility to produce scholars to fuel national development, higher institutions in Africa are constrained by space, time, and money. Against the backdrop of these factors, there is the need for the adoption of innovative learning methods that will permit the delivery of education to the majority of people who are looking for access to higher education.

Distance education appears to offer an option for African students in search of higher education but are not in a position to afford it. Distance learning can provide instructionally effective, highly interactive learning experience that are flexible, equitable and responsive to individual needs. (Rogers, 1996). Studies show that distance education is more cost-effective than

traditional programs, especially with large student enrollments and a good support system for students (Daniel, 1996). Unit costs per student is below that of conventional programs (Daniel, 1996).

The promise of ICTs on the continent is enormous. Emerging Information Communication Technology (ICT) holds much promise for breaking down the traditional barriers that have limited access to higher education. If this approach to educational development is used judiciously, it will open up new frontiers to learning; enrich collaborative research among African universities and between universities in Africa and other parts of the world; promote cross-national, multi-disciplinary perspectives in educational practice, and thereby equip students, faculty, and administrators with tools and resources that would enable them to successfully engage the academic world of the 21st century. Today, through distance learning strategies and computer applications, we can expand the content, extend the reach, and increase the effectiveness of existing academic programs. Through emerging communication technology, effective computer delivered coursework could be developed; and improve access to scientific and technical information.

Institutions With Distance Education Projects in Africa

Distance learning techniques are increasingly being employed by a growing number of higher institutions in Africa. While most of the on-going distance education initiatives on the continent have been used to upgrade the quality of basic education (ADEA, 1999), some countries are taking bold initiatives in piloting Internet-based, video-conferencing, and other forms of multimedia (ADEA, 1999). The University of Abidjan and the African Virtual University are good examples. Also, the Telesun program in Cameroon uses Internet-based courses in its science program. The FORST program links Benin and three other countries with McGill University in Canada. And the RESAFAD program in Djibouti provides teacher training from French universities (ADEA, 1999). For the majority of the institutions, the delivery platform to date has been text and correspondence based. This is supported by print material. Four institutions in South Africa provide distance education courses- Technikon SA, the Technical College of South Africa, Vista University, and the University of South Africa (UNISA), the oldest mega-university. Its distance education program to off-campus students was started in 1946 (ICDL, 1995; Wiechers, 1995), with an enrolment of over 130,000 in 1995 (Wiechers, 1995). This represents over one-third of all university enrolments in South Africa. These schools enroll over 225,000 students annually (Butcher, 1998). UNISA uses print material, audio cassettes, and community radio

The most ambitious distance education initiative on the continent to date is the African Virtual University (AVU) Project. This is the first satellite based attempt to harness the power of information technologies to deliver university education in the disciplines of science and engineering, non-credit/continuing education programs and remedial instruction to students in Sub-Saharan Africa. In the words of Baranshamaje (1996), it represents the quintessential instruments for sharing resources at affordable prices to large numbers of people (p. 3). The AVU project will deliver instructional programs, strengthen the capacity in African partner institutions, implement a network infrastructure, and implement a digital library program (Baranshamaje, 1996).

About five Anglophone and five Francophone African countries are participating in the initial pilot phase. The project will be extended to other African countries during the third and final phase (AVU Executive Summary, 1997). Another virtual university program supported by the World Bank and the Agence de la Francophonie is the Universit francophone project.

Challenges In Implementing Distance Education in Africa

While distance education holds promises, a number of obstacles will have to be addressed before it can be fully utilized on the continent. The following section addresses the challenges.

One of the major challenges in promoting distance education on the continent is technological constraints. Telephone and other communication infrastructure beyond the cities remain inadequate. Connectivity beyond the major capital cities poses a potential problem in creating a national distance education strategy. Even though Africa has about 12% of the world's population, it has only 2% of the global telephone network and over half of the lines are in the cities (Marcelle, 1998). Telephone density is less than 2 lines per 1,000 inhabitants, compared with 48 per 1,000 in Asia, 280 per 1,000 in America, 314 per 1,000 in Europe, and 520 per 1,000 in high income countries (International Telecommunication Union, 1996).

Another challenge is the lack of a trained cadre of professionals to support the implementation of distance education. The effective use of distance learning technologies demands that faculty be properly trained in using distance education as a delivery mode. To date, few African scholars are familiar with teaching in an on-line (virtual) environment. And this poses a major challenge in introducing distance education on the continent.

The absence of clearly defined national distance education policies in most African countries poses another challenge. Policies are needed to provide a framework for the development of distance education in the various African countries. With the exception of South Africa, few African countries have a clearly defined national information or communication policy to guide the development of distance education and technological development in their respective countries. The absence of such a policy is a clear obstacle to the development of distance education on the continent.

Access to connectivity remains one of the major challenges in Africa. Students would need access to a computer that can send and receive messages using a "browser" such as Explorer 3.0 or higher, or Netscape. They would need an email program, which might be "hotmail" or a similar program. They might need a word processing program. They would need connection to an Internet Service Provider (ISP). They might need, depending on the course, access to a VCR to play videotaped instruction, and perhaps tape recorded lectures. They would need in some cases commercial textbooks. And all these cost money.

The Association for the Development of Education in Africa (1999) lists additional limitations. Among them are a) the lack of high level political support for distance education by political authorities in Africa, b) the lack of recognition of distance learning by the public service in its assessment of employee qualifications, c) the availability of professionally trained distance learning personnel, d) the lack of follow-up and support programs, e) limited budgets, and f) poor domestic infrastructure.

Closely related to connectivity problems is financial. ISP services are expensive in Africa. The connecting colleges charge tuition, in some cases by law very high tuition to students taking those courses. A source of financial support would be needed from some source. For example, multilateral agencies such as World Bank; the United States Agency for International Development (USAID), and national institutional donors such as churches and employers have a role to play in exploring funding sources.

Another challenge to overcome is cultural bias. Current research into distance education has focused on the process as a western social/cultural/educational constructs, and is being viewed by some as a way to export this worldview to other nations more efficiently and quickly than by other media currently available. (Moore and Thompson, 1990 Barker et al.,1996; Bork, 1993). Distance learning, by its very nature, involves more than just the transmission of information, but also the transmission of cultural/social paradigms between and among the participants. This transmission is a very important facet of any design of a distance learning curriculum that is sensitive to the cross-national cultural experiences (Cummings and Sayers, 1990, 1996; Sayers, 1991; Spirou, 1995). To date, most of the distance learning models have been developed and tested outside of Africa- in American, Canadian, or European educational environments. Without diligent research focusing on localizing content, this might pose a problem (Cummings and Sayers, 1990; Owston, 1997; Sayers, 1991;). To date, few scholars or technocrats supporting the push for information technology access for schools have examined questions regarding the possible effects information gained, via the technology, may have on the culture and traditions of a people (Asante,1992; Ani,1994). Clearly, there is the need to address cultural issues so that distance education effort on the African continent would not be seen as an attempt by foreign institutions to extend their influence to the continent (some may view it as cultural imperialism).

Clearly these needs would at the present time make taking on-line courses difficult or impossible technically for those who a) do not have or can not get access to the computer, modem, ISP, and this would mean, the majority of Africans. Potential students in the larger cities that have ISP access, and which have or might have "community or church learning centers" or other ways of providing the needed technology, might be served quickly if the other issues can be attacked.

Closely related to connectivity problems is financial. ISP services are expensive in Africa. The connecting colleges charge tuition, in some cases by law very high tuition to students taking those courses. A source of financial support would be needed from some source. For example, multilateral agencies such as World Bank; the United States Agency for International Development (USAID), and national institutional donors such as churches and employers have a role to play in exploring funding sources.

Fortunately, Africa is awakening to the potential of information technology to take advantage of the opportunities offered by distance education. The efforts of national governments and international donor agencies have contributed to this situation. For example, the United Nations Economic Commission for Africa Pan African Development Information Systems (PADIS) Initiative aims to establish low-cost and self-sustained nodes to provide access to electronic mail in 24 African countries. Another is the African Information Society Initiative with its primary goal of building information and communication infrastructure in Africa. Similarly, the United States Agency for International Development (USAID) Leland Initiative aims to provide 20 African countries with connections up to 128 kilobits. In addition, the program will provide assistance with materials, expertise, training and free internet access for a limited period.

In addition to the above initiatives, professional organizations have emerged to champion and promote distance education on the continent.

Addressing the Challenges

Established institutions have a role to play in addressing the challenges in creating distance education on the continent. For example, religious organizations have a commitment to outreach, to service, to mission. They often have a room or two that is not occupied on days other than worship days. One of these rooms in the church can become a telecentre, a community learning center, and its services offered to the community surrounding the church as well as its own congregation.

Such centers could provide a simple, single point access to information and educational resources to church members and students seeking access to higher education.

Effective measures to sustain distance learning initiatives needs to be considered. While donor funds could be used as the basis of establishing distance learning programs on the continent, sound financial planning by African educators to ensure that funds will be available to continue offering distance education programs when donor funding becomes scarce. Tuition costs have traditionally been the source of revenue to sustain distance learning initiatives. In addition, African stakeholders interested in launching distance learning initiatives should consider gathering resources from various agencies, sharing facilities and offering joint programs. This will go a long way to reduce the start up investment costs for the information infrastructure needed to launch distance learning initiatives on the continent.

Since the concept of distance learning and educational technology is still emerging on the continent, a learner support system needs to be put in place to assist students to comprehend all the technical details needed to make effective use of the technology. Research shows that distance learning requires a lot of self-discipline on the part of the student; student isolation tend to be high, compared to conventional learning (Potashnik & Capper, 1998). Strategies for reducing drop out should be put in place to ensure successful completion of programs.

There is the need for higher institutions on the continent to form partnerships with business, industry, and government to help promote distance education on the continent (Darkwa, 1999). These bodies will be very crucial in helping to advance the development of distance education. The private sector will help develop the technology for the delivery of distance education; the government will help formulate national policies to promote distance education, while academicians will help develop locally-based content (Darkwa, 1999).

Institutional linkage programs between African institutions and foreign partners who are pioneers in applying distance education is needed. Such programs will offer African students the opportunity to take courses on-line, without leaving the shores of their countries.

Creating awareness about the potential of distance education is needed to expose its potential. African Ministries of Education have a responsibility to assist in facilitating this process. Additional efforts could be made to explore the establishment of the necessary infrastructure to support the delivery of distance education courses outside the boundaries of the universities.

One of the major obstacles to expanding the incorporation of distance education into the educational system in Africa is the lack of a well-developed telecommunication infrastructure on the continent, The telecommunication industry is not very active in the provision of telematics services. Besides, telecommunication services are limited to urban areas in Africa. Rural telecommunication infrastructure is highly underdeveloped. This implies that rural institutions are less likely to benefit from the advantages offered by information technology. This calls for an extension of the telecommunication infrastructure to be extended to the rural areas of Africa.

The need for faculty training is essential if Africa is to make any significant headway in applying DE technologies for social work education. Faculty training could be done in conjunction with private information technology institutions and relevant academic departments who have expertise in these areas. The training could be offered by renowned experts in both the public and private sector who have distinguished themselves in the use of emerging communications technologies.

Steps should be taken to advance and support the use of information technology and move rapidly and aggressively to develop programs of the highest quality to advance the promotion of technology-based development on the continent. This should be seen as an act of strategic that touches on the future of higher education on the continent. We hope African educational policy makers will explore, encourage, and promote the development and use of emerging communication technologies at all levels of our educational spectrum.

Invariably, the decision to develop the infrastructure needed to launch distance education initiatives on the continent is primarily a political one. This need to build the continent's distance learning capacity has been echoed by interest groups on numerous occasions. It is time to translate words into action by putting structures to help promote distance education. If the authorities in key decision making positions fail to act, there is little hope for seeing progress in this area. Without this, it will be over-optimistic to expect far-reaching changes in the telecommunication infrastructure of Africa. This calls for a commitment on the part of African political leaders to address the telecommunication imbalance in the country. Without that, very little progress will be made in this area. This requires a whole-hearted political commitment to this cause.

Future Prospects

In spite of the challenges confronting the advancement of distance education on the African continent, there is a growing interest in the concept. Several African leaders are increasingly becoming aware of the potential of distance education in addressing educational challenges. The political leadership in countries such as Burkina Faso, Ghana, Kenya, Tanzania, and Zimbabwe have made recent statements pledging their support to distance education. Awareness about the potential of distance education is spreading among African students and educators. The activities of community-based groups and

academic organizations such as the Ghana Computer Literacy and Distance Education, Incorporated (GhaCLAD), the African Distance Learning Association, the Association for the Development of Education in Africa (ADEA), the Commonwealth of Learning, and the Working Group on Higher Education (WGHE), African Association of Universities (AAU), the West African Distance Learning Association, the Acacia Initiative, the African Information Society Initiative (AISI), and WorldLinks have contributed to this awareness. Multi-country cooperation in launching distance education initiatives (e.g., the cooperation between Mauritius and Madagascar, and between Cote d'Ivoire and Burkina Faso), and the creation of non-university-based distance learning programs are likely to be the norm. National organizations have emerged in some African countries to promote distance education. An example is the National Association of Distance Education Organizations of South Africa (NADEOSA). The activities of such organizations are having a tremendous impact in shaping the future of distance education in Africa. The future looks bright for the evolution and development of distance education in Africa.

Conclusion

Effective measures to sustain distance learning initiatives needs to be considered. While donor funds could be used as the basis of establishing distance learning programs on the continent, sound financial planning by African educators to ensure that funds will be available to continue offering distance education programs when donor funding dries up. Tuition has traditionally been where most of the revenue to sustain distance learning initiatives have come from. In addition to this source of funding African stakeholders interested in launching distance learning initiatives could pool resources together to share facilities and offer joint programs. This will go a long way to reduce the start up cost investment in information infrastructure needed to launch distance learning initiatives on the continent.

Universities without walls have a lot of appeal to Africa, given the multiple economic constraints confronting the continent. On-line universities without walls will enable Africans to increase enrollment levels, gain access to up-to-date educational materials through on-line libraries, provide virtual access to the best faculty around the world, share resources, and become part of the global learning community.

Since the concept is still emerging on the continent a leaner support system needs to be put in place to assist students confronted with challenges. Strategies for reducing drop out should be put in place to ensure successful completion of programs.

Africans need to examine the pedagogical effectiveness as well as the cost of each of the available delivery platforms to ensure that it has the capability of meeting the educational needs of institutions that make use of it.

The complexities for introducing distance education to the continent is enormous. But, this initiative appears to represent hope for the millions of Africans who are looking for access to higher education. It is our hope that through distance learning opportunities, fewer Africans will leave the continent for better opportunities elsewhere. The hope is that we can become a team of friends and devoted collaborators, pooling our experiences, resources, and connections to serve the African continent.

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ICTs for Learning
An International Perspective on the Irish Initiative

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Abstract

"Where the appropriate systems of support are in place, then ICT can be experienced as a 'transformative technology' both for staff and for students [Comber & Lawson 1999, p 51].

Around the world governments are investing heavily in promoting the use of ICTs within the school system. Our research explores the Irish Policy Framework (IT 2000) and the National Action Strategies of two European countries, Finland and Sweden. The focus is on curriculum and assessment, and evaluation of the use of ICTs in the classroom, as these are key factors in forming policies to influence the use of ICTs as tools to reshape learning. An underlying aspect of the research is that, due to the use of ICTs by governments for the dissemination of their national strategies, concerned individuals can be empowered to compare and contrast policies, identify best practice and make a contribution to the formation of the policies of their own nation by publishing in turn their research.

The Irish Initiative - An Overview

In 1997, the International Data Corporation (IDC), ranked Ireland in the third division (position 23) with respect to the country's preparedness for the Information Age [IDC 2000]. Recognising that Ireland was lagging significantly behind, the Irish Government's Schools IT 2000 initiative was launched in November 1997 to redress the balance in the area of education [DES 1997]. IT 2000 has yet to be fully evaluated but the implementation of the programme allows for its comparison to similar initiatives in other countries so as to assess and expand the programme.

IT 2000 is a policy framework for the integration of ICTs in first and second-level schools. The core objective of the policy was to put in place an infrastructure to ensure that: *'pupils in every school should have opportunities to achieve computer literacy and to equip themselves for participation in the information society; support is given to teachers to develop and renew professional skills, which will enable them to utilise ICTs as part of the learning environment of the school'* [DES 1997, p. 2-3].

In order to achieve these aims, IT 2000 sought to target action on: classroom resources and infrastructure, teacher skills development and support, policy and research. A key objective was to *'bring about a national partnership involving schools, parents, local communities, and third-level institutions together with public and private sector organisations to meet the project's ambitious aims'* [DES 1997, p.2]. In order to manage the implementation of IT 2000, the National Centre for Technology in Education (NCTE) was set up in March 1998. A key aspect of the plan was that a policy formulation unit was to be set up within the educational ministry to act as the focal point for the formulation of policy in all educational ICT related matters[1].

Since the launch of IT 2000 in 1997, the profile of ICTs within the country at large and the education system in particular has been raised significantly. Most schools are connected, by at least a dial-up line, to the Internet and over 40,000 teachers have participated in at least one course in computer literacy training. A national educational portal (Scoilnet[2]) has been set up and funding has been provided for selected schools that are engaged in ambitious ICT related projects[3].

How effective IT 2000 has been in improving the quality of learning, or to what extent ICT has been integrated into the teaching process, are important questions to ask at this stage but the lack of a large scale integrated approach to assessment should not preclude valid individual assessment of government

[1] The Educational ICTs Co-ordination Unit within the Department of Education and Science (DES).
[2] www.scoilnet.ie
[3] The Schools Integration Project (Support Infrastructure strand) of IT 2000 has produced the best examples of learning with technology. See www.sip.ie for details.

policy. The increasing use of ICTs to disseminate information provides a platform for a widening of the idea of action research so that teachers can learn from reflecting on and assessing their own practice, this should be further expanded to include the role that individuals within a system can have in reflecting on and evaluating their own environments.

We believed initially that ICTs within the classroom is still largely confined to the 'early adopter' category and that severe challenges are in store in any attempt to spread the use of ICTs into the 'late majority'. We decided to check our initial impressions and benchmark Ireland's progress on the treatment of the key issues of evaluation, and curriculum and assessment, compared with that of 'leading countries' in the area of ICTs and learning.

Scandinavian Initiatives

Finland and Sweden are, among two of the Scandinavian countries, regarded as having a progressive approach to Information Society issues in general and education in particular. They are also comparable to Ireland in terms of population and economic climate. Unlike Ireland these countries have had substantial investment in educational action strategies for ICT going back to the early 90's, moreover, they have had the time to learn from evaluations of their previous strategies. Their current strategies for Education are action strategies, which clearly articulate a vision for the reshaping of the curriculum and the organization of learning.

Finland

Finland's most recent National Plan (2000-2004) is a concerted effort to implement a comprehensive action strategy aimed at reshaping the role of learning within, and outside, the school system. The focus of the strategy, "*Education, Training and Research in the Information Society. A National Strategy for 2000 – 2004*" is on education, training and research [Finnish Ministry of Education 1999]. While a strategy, of itself, does not create educational change, the commitment on the ground may be furthered with strong signals from the top that in turn support bottom up initiatives. In terms of equality of opportunity, the plan safeguards corresponding standards for both students and teachers. The Finnish strategy provides students and teachers with a detailed framework for the organisation of learning, in contrast with the Irish framework, which appears to lack this dimension in its planning. Furthermore the strategy is a learning and motivation campaign for the population as a whole. It focuses not just upon formal education, but also on all sectors and includes all citizens, from the very young to the elderly. One of the key aims of the Information Age is empowerment of the individual in terms of life-long learning. This is emphasised in the Irish Government's action plan for implementing the Information Society, where it is stated that, '...developing the concept of lifelong learning, of extending access to the formal educational infrastructure to those outside the formal education process and of identifying further options to introduce new learning possibilities for the population in general' [Government of Ireland 1999]. 'Learning to learn' is one of key indicators in a recent EU report on the quality of school education [EU 2000] and the Finnish strategy recognizes this importance and that students and teachers need to improve their skills in the area of communication and in the acquisition of, and management of, information.

Sweden

Support from the top has been recognized as one of the key factors in achieving innovation in the Information Age and the Swedish IT Commission has played a highly influential role in supporting governmental developments in this area. The present commission, appointed in May 1998, is chaired by the Minister of Industry and Commerce. An interesting aspect of the Swedish Information Age initiative has been the setting up of a Youth Council to encourage discussion on the future society from young people's perspectives and, in addition, to propose political actions to respond to the progression towards a future society based on the use of ICT.

In 1998, the Swedish Government submitted to Parliament the report "Tools for Learning -A National Programme for ICT in Schools. [ITiS 1997]. The Delegation for ICT in Schools was given the task of planning and implementing the programme, which became know as the National Action Programme 1999-2001 [ITiS 1998]. The emphasis of the plan is on teaching with technology, rather than teaching about technology, emphasised by Wärnersson stating that: '*The new technology will not replace teachers, textbooks or the classroom. It will supplement them by creating new combinations of*

opportunities and help to put pupils' learning in the very centre.' [The Minister for Schools and Adult education 2000][4]. It is based upon a revised curriculum and subsequent changes in the learning environment. In scope it covers pre-school, compulsory school and the upper secondary school. The implementation plan was initially expected to involve 60,000 teachers (40% of teaching workforce) but has recently been increased to reach 73,000 teachers.

From Policy Framework to Action Strategy - Issues

As previously stated IT 2000 has had a significant impact on the Irish education system. From the strategic point of view, however, a number of aspects of IT 2000 bare reflecting upon and these are now discussed with reference to the Scandinavian initiatives.

Overall Scope and Aims

The original IT 2000 framework document stated that, *'among the most important outcomes of the framework will be a comprehensive national policy on the role of ICTs in Irish schools together with a strategic action plan specifying the activities and resources necessary to fully implement the policy'* [DES 1997 p.22]. A policy unit, however, was not formally set up until October 2000, which meant that an air of uncertainty surrounded much of the implementation work of the program.

One of the key aims of the Information Age is empowerment of the individual in terms of life-long learning. This view is echoed in much of the Information Society literature, for example [ISC 1999, 2000]. The focus of IT 2000 has however been upon first- and second-level schools within the formal education system with other areas receiving attention only from parallel initiatives – if at all. This contrasts sharply with the Finnish strategy, which embraces all learners from the very young to elder citizens.

At the outset of planning in Ireland it was acknowledged that integrating ICTs in learning is a complex process. It was also accepted that revolutionary approaches and 'quick-fix' solutions involving extensive expenditure on hardware and software can carry the very high risk of large-scale waste and furthermore of outright failure [DES 1996]. With this awareness incorporated into the overall policy, IT 2000, nonetheless, allocated 60% of its total budget on equipment and infrastructure. One justification for this was the relatively low base from which schools were starting.

The most recent data available from the NCTE states that the total number of computers in schools has increased by 65% since 1998, with the current studen: to computer ratio at Primary level being 18:1 and Post Primary 13:1. All schools are now connected to the Internet by at least a dial-up line. 69% of Post Primary schools have an ISDN line and 62% of all schools have Internet access on more than one machine.

According to an international survey carried out by Angus Reid, 78% of Swedish students, between 12-24 years, are using the Internet from school (nearly three-in-four students in Sweden say they use the Internet from school, a proportion roughly equivalent to the level of home Internet access). More than nine-in-ten students who have Internet access report using the World Wide Web to complete their school assignments. [Angus Reid 2000].

Evaluation

Evaluation of the effectiveness of the use of ICTs for learning is a fundamental concern at present, particularly as there is a remarkable absence of reliable data on the use and effects of ICTs in European countries. One of the key recommendations of a European report, focussed on how learning with ICTs is changing (13 countries), was that EU 'central ministries and regional authorities should co-operate in gathering, analysing and disseminating data, not only on inputs into the system such as pupil/computer ratios, but also on process variables such as deployment and pupil/teacher access time and actual

[4] ***Ms Wärnersson, Minister for Schools and Adult education***, in a foreword on ITiS website: http://www.itis.gov.se/english/back.html#A National Action programme for ICT - why?/

outcomes' [Becta 1998, p17]. Government supported initiatives in Finland and Sweden are to the forefront in this regard, while to date most of the studies of IT 2000 have been quantitative rather than qualitative in nature.

Prior to and during the period of the Finnish National Strategy 1995-1999, significant funding was made available to schools, universities and vocational institutions in order to purchase ICT equipment to network schools and to fund teacher training. The Finnish Parliament's 'Committee for the Future' adopted 'ICTs in Teaching and Learning' as one of its evaluation projects and asked the Finnish National Fund for Research and Development (Sitra) to administer it. Hundreds of pupils, teachers, decision-makers, researchers and officials participated in the project. Various reports focused upon: universities, kindergartens and institutions of general and vocational education, lifelong learning and digital learning materials. In addition to eight reports published in Finnish, a final report was published in English entitled 'The Challenges of ICT' [Sitra 1999]. The important value of these reports is the extent to which they were able to inform subsequent policy formation.

'.... the investigation is not limited to schools, for studying is breaking down school walls more forcefully than ever before, extending itself to be a lifelong learning and open activity of many forms without being limited to place or time. We follow it to homes, old people's homes, libraries and businesses.' [Sitra 1999]

The Swedish National Agency of Education (Skolverket) plays a strong role in ensuring the collection and analysis of data from ongoing learning projects in the schools. Follow up research activities are undertaken by a special research unit within the agency. Skolverket also sponsors the research programme ELOIS (Students, Teachers and Organisations around Information Technology in School), which is an extremely important participant in the evaluation of ongoing activities [ELOIS 2000]. The work it produces includes annual reports on the influence of ICTs on the role of student, teacher and organization of work. The agency is supported in this work by eleven centres across Sweden. In addition to four quantitative studies (supply and resources of computers), extensive qualitative reports with information on international experiences are also available, [Skolverket 2000]. Further information is available from the Foundation for Knowledge and Competence Development (KK-Foundation), established in 1994, which has put in place a web-based database of projects. The projects are used to evaluate and test innovative activities using ICT as a pedagogical tool. The wide and varied experience of involvement in over 250 projects, ranging from Teaching Materials to Disability and ICT, are disseminated to aid in influencing future developments [KK 2000].

Thus it can be seen that substantial qualitative studies are central to the two Scandinavian initiatives. Ireland could benefit from following such examples.

Curriculum, Assessment and Learning Environment

Curriculum and assessment are at the heart of any educational system and to a large extent shape the nature of the learning environment. A key objective of IT 2000 was the introduction of curriculum innovations to enhance learning through the use of ICTs in the classroom [DES 1997 p. 26]. This development was to be achieved through co-operation with the National Council for Curriculum and Assessment[5] (NCCA). While one of the principles of NCCA policy is that all learners should use ICTs in relevant curriculum contexts, [NCCA 1998], there is only limited mention of ICTs in many of the revised curricula. This holds particularly true for the new Primary Curriculum[6], Junior Certificate and Leaving Certificate[7] curricula. This has very serious implications for the organisation and reshaping of learning in Irish classrooms. The syllabi afford great freedom to innovate, the process, however, is not credited in national assessments. While there is much talk about the benefits of life long learning, Little (1991) referring to the Irish educational system notes that 'For many learners at second and third levels the most important thing is not that they should learn, but that that they should get good qualifications' [Little 1991, p. 47].

Teachers understandably see the curriculum, and particularly assessment requirements, at second level, as not yet strong enough to make the integration of ICTs an imperative for schools. Evidence of this is

[5] The National Council for Curriculum and Assessment (NCCA) is the body responsible for advising the Minister for Education on matters related to the curriculum and assessment procedures for primary and second level education.

[6] A new Primary School Curriculum was introduced in 2000.

[7] The Leaving Certificate is the nation-wide state examination taken at the end of second-level education. For most students the results of this exam is the sole criteria taken into account for entry to 3rd level education.

found in a recent survey of Irish post-primary teachers, where it is reported that just 29% of the teachers surveyed had used ICTs in teaching [Mulkeen 2000]. Conway argues that 'IT 2000 underestimates the curricular scope of computer literacy and although it is not a curriculum document, the inattention to the curricular scope of ICT integration is problematic' [Conway 2000]. Austin et al [NCTE 2000, p. 88] argue that if the intention is that ICTs will have a catalytic effect on classroom practice, policy must play a critical role in ensuring that curriculum and assessment systems accommodate this change.

In Sweden, since 1992, there has been a major shift in focus from teachers teaching to pupils learning. The new curricula and syllabi state that all subjects should integrate the use of computers as a tool where appropriate [ITiS 1998]. In line with this, assessment structures and the organisation of learning and the leaning environment have also been modified. ICTs are seen as powerful tools to promote the transition from one teacher in one classroom to teams of teachers working together with larger groups of students.

> *"Evaluations of ICT projects in schools provide strong evidence that only when the organization of work has been changed can the introduction of ICT fully support the learning of children."* [ITiS 1997]

An outstanding example of a collaborative and integrated learning environment is the Swedish Färila[8] Project, where classrooms have been replaced with open areas and the traditional teaching style replaced by a more collaborative learning focus. All students have access to a personal portable computer. Just 16% percent of time is spent studying with a teacher, reduced from 42% in 1995 [Knut 2000]. This radical overhaul has contributed to the raising of grades in one particular school from one of the lowest in the country in 1993, to being a school with one of the highest grades in 2000.

Across Sweden inter-disciplinary, problem-based and pupil-oriented development projects are planned and carried out together by pupils and teachers working in teams. The aim is to promote and develop the learning approaches of students and teachers. A pedagogic facilitator appointed by the municipality supports the teams, but using each other's knowledge is prioritised. Furthermore, each one of the teachers was supplied with a multimedia computer for the home. The idea behind this is that teachers who use computers at home will use it as a professional and pedagogical tool. Local conditions and the individual desires and needs of participants are taken into consideration in the planning of training for students and teachers. Active involvement of Head Teachers is strongly encouraged and supported. The work of schools involved must be organised in such a way for the team to be able to work effectively on a joint development project. The school must ensure that it has in place technology of appropriate capacity and of sufficient quality to support the work of the team. Organized technical assistance for the participants is at hand to ensure that ICT functions as a working tool in the classroom, [ITiS 1998].

Similar characteristics can be found in the Finnish strategy, which places strong emphasis on the participation of students. The plan acknowledges students' information technology skills and encourages their participation in the practical operation of educational establishments. Even more importantly the involvement of students in the preparation of teaching materials is encouraged. Students, especially female ones, are encouraged to participate through the awards of scholarships, fees and involvement in competitions arranged with appropriate business sectors. In keeping with the emphasis of the role of the learner, the curriculum has been changed. The Finnish policy, moreover, emphasises a move from the classroom to the development of an open learning environment. There is a specific action in the plan devoted to the planning of education and educational establishments and their influence on the teaching and the learning environment.

Conclusion

Bearing in mind, *'that among the most important outcomes of Schools IT 2000 will be a comprehensive national policy on the role of ICTs in Irish schools together with a strategic action specifying the resources necessary to fully implement the policy'*, Ireland has much to learn from developments in Finland and Sweden [DES 1997, p4]. IT 2000 noted the high ranking of small countries and, in particular, the fact that all these countries had national strategies for integrating ICTs [DES 1997, p.14].

[8] The Farila school website is at: http://www.farila-ljusdal.se/farila_skola/default.html (Information available in Swedish only).

In Finland and Sweden, the National Strategies have played their role, but even more importantly comprehensive action plans have been developed arising from in-depth evaluation of learning with ICTs in both countries. Finally, evidence of the recommendations of the evaluation of ICTs for learning is evident in the incorporation of an adjusted rethinking of curriculum, assessment and learning environment in the action plans of both countries. In summary, both action strategies have evidently prioritised the pedagogic and catalytic goals for integrating ICTs alongside, but not above the social, vocational and economic benefits of their use.

> *"...many countries are just at the start of a very long and challenging road ahead, but it is intended to make that path somewhat easier by distilling the wisdom from what others have learned and sharing the results."* [Becta 1998]

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An In-Service Program in Applied Linguistics for Language Teachers

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Abstract: Given the recent rapid changes in the educational field in Mexico many language teachers face new challenges for which even recent graduates of training programs may be ill-equipped to deal with effectively. Among other new challenges, teachers are being expected to take an ever more active role in syllabus, program and materials design. They are also increasingly expected to be able to manage new technologies. In order to participate they need to transform themselves from technicians to professionals and to do this they need updating in the theoretical and practical bases of their field. This project, sponsored by the National University's Support Program for Institutional Projects for the Improvement of Teaching, hopes to address these needs through a model which combines the applied linguistic content with experience in the use of educational technology.

Objective

The project's objective is to design a distance-learning teacher-education model, including courses, that might serve as the basis for in-service development of language teachers at the high school and university levels, in the area of applied linguistics. The goal of the project is to create a learning community among course participants. They will experience (in many cases for the first time) the use of educational technology to support their learning and will become both independent and collaborative learners. Proposed activities will encourage interactivity within the learning community; participants will inevitably discuss, argue and share their beliefs and ideas about their own teaching. In the long run we hope to create colleagues not only former students.

Background

Since 1980, the Foreign Language Center at the National Autonomous University of Mexico has trained more than 800 foreign language teachers. These teachers work at both public and private high schools and universities. In conjunction with the Graduate Program in Linguistics, the center offers both a Masters in Applied Linguistics and a Doctorate in Linguistics.

This project is part of a university-wide program to benefit researchers and teachers. In an effort to respond to teachers' needs for better professional development, a group of researchers at the Foreign Language Teaching Center proposed designing a Distance Learning Diploma in Applied Linguistics that, to

date, would be unique of kind. Preliminary work on the project began two years ago and other centers have become involved, particularly in such areas as distance learning, web page design, and the use of educational technology. The research team is now complete and the development of the teacher-education model and course design are fully under way.

The project was inspired by the previous work done on distance education and most particularly on the work of Dulce Gilbón Acevedo who with Karen Lusnia designed the first course in distance education for professors at our center (Lusnia & Gilbón 1998) and most especially on the work done by Dulce Gilbón for her master's thesis on the need and possibilities for graduate education in applied linguistics. (Gilbón 1998) On these foundations the project was designed and approved, and with the new year we began to work in earnest.

The program

The program consists of a series of courses related to the most salient areas in the field of Applied Linguistics, i.e. Introduction to Applied Linguistics, Psycholinguistics, Sociolinguistics, Evaluation, Reading Comprehension and Linguistic Aspects in Communicative Approaches. At the very beginning, a course called "How Do I Learn Applied Linguistics through Distance Learning?" is required. This is a 30-hour course to give an orientation to the use of educational technology and to teach some basic information on Applied Linguistics. This course has been piloted once and although it has been well received is being revised.

The program is in a sense open ended. These courses, or modules, are basic to teaching situations of the participants but as more modules are created it is hoped that the teachers can design a program that fits their own needs.

The model

The development of the teacher-education model has taken the following issues into account:

a) Teacher development. Continuous teacher education is absolutely necessary for high school and university teachers. Both the model and course content have to meet their needs.

b) The design of the program. A constructivist/collaborative perspective seems to be the most promising.

c) Materials development. Both printed and on-line materials will be used. If necessary, CD-ROMS, cassettes and videocassettes will also be developed. The criteria for the use of media must be based on the goals and needs of the participants on the practicalities of their situations-

d) The role of educational technology in all of the above

In the research team's view, a teacher-education model is a symbolic representation of the teaching-learning process. However, a model can be interpreted in different ways, as it is only a way of looking at interrelated issues. The same model can be interpreted at different levels: epistemological, theoretical or methodological. In the development of this model we refer to those theoretical issues that have been considered up to now and that have been fully discussed by the project team.

Although the final model is still a rather vague and heuristic one, the discovery process of the interaction in the development team has lead to a reconstruction of views even among those of us who have taught instructional design. Some of the models we have discussed have been algorithmic, some impressionistic but the above elements have appeared in all.

Teacher development

Teacher development is a continuous process. It can be an independent process in the sense that it is the teachers themselves who want to take part in a development program. Teachers will come to the program with their own experiences, with background knowledge about each of the courses, and with expectations and ideas about what teaching is, and about the use and usefulness of educational technology. In the learning process itself, they will be confronted with new knowledge that will help them to think about their teaching practice and their attitude towards the program. Course activities will lead teachers toward learning by doing and experiencing, and reflecting on what has been learned. (Scrivener 1994, Díaz Barriga & Hernández 1998)

It is also important to consider at this point the fact that teachers are adult learners who, by definition, grew up without the most recent technological innovations; inevitably, some will resist the change from print to "on-line". They can be expected to take time adjusting to the virtual classroom. Thus, the project cannot rely exclusively on multimedia technology. The goal is to introduce or seduce the participants into seeing the advantages that they can achieve by the use of the technologies. In our pilot of the first course these issues emerged as might be expected but the trend was definitely positive and the web based activities were a "hit".

Applied Linguistics

The field of Applied Linguistics has not yet been well defined. Some authors still see it as part of Linguistics. (Barriga y Parodi 1998) Nonetheless, in general, it can be considered an interdisciplinary area that tries to solve problems related to language. A look at the topics of international academic events shows its breadth: bilingualism, language therapy, curriculum design, intercultural communication, and so on; however, it is not the number nor the kinds of topics that Applied Linguistics deals with, but rather the interest in identifying uses that leads to the development of theroetical models that can help in the explanation of problems related to language. The theoretical aspects of the field are precisely those that participants need to justify their projects and to participate fully in the roles they are acquiring. All teachers who participate are credentialed teachers and many have years of experience.

Distance Learning

Distance Learning makes learning possible through the virtual classroom which, according to Porter (1997), should ideally recreate an effective learning environment creating the conditions and providing students with the tools in order to respond to their expectations and needs. Distance learning is, according to Harrison (1999), often applied to the materials and media that allow people to learn away from a source of expertise or training. Therefore, we also have to consider that technology is a support, a tool that will be used by teachers and learners to have access to knowledge but at the same time we can learn with technology and from technology. Therefore we must review carefully what we want from it.

There is a direct link between distance learning and self-directed learning. Self-directed learning describes a particular attitude to the learning task, where the learner accepts the responsibility for all the decisions concerned with his learning but not necessarily undertake the implementation of those tasks (Dickinson, 1987). Here, we can realise that the learner is an autonomous and independent one, but the process he/she has to go through is neither easy nor fast.

The role of educational technology

In recent years, there has been a consciousness raising wave towards the way technology should be treated in schools. Jonnassen, Peck and Wilson (1999), under a constructivist perspective, amongst other issues, assume that:

- Technology is more than hardware. It consists of the designs and environments that engage learners.
- Learning technologies can be any set of activities that engage learners in active, constructive, intentional, authentic and co-operative learning.
- Technologies support learning when they fulfill a learning need.

From these ideas we can see that working under a constructivist perspective serves as a guide to develop appropriate methodology (clear objectives, activities, assessment and self-assessment techniques) and appropriate materials to implement the mentioned courses. In order to make to right link with all these aspects it is necessary a clear understanding of the whole constructivist paradigm.

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Virtual Exchange Program: Coming to a Computer Near You?

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Abstract: In the spring of 2000, a"Virtual Exchange Program" was piloted by the Koerber Foundation's Transatlantic Classroom project. The intent of the program, initiated by the author, was to allow American high school students of German to electronically correspond with Americans of the same age who were in Germany on a one-year, U.S. Congress-Bundestag Exchange Program.

Introduction

Since the medium for the American-to-American correspondence about Germany transpired primarily in English, the rationale for this pilot program was not based upon teaching Americans German. The program sought to introduce an intercultural experience into the foreign language classroom that would directly stimulate and provide for an interest in contemporary German culture.

Findings

American exchange students in Germany corresponded with high school students of German in America (in Bozeman, Montana). Highlights of their correspondence, conducted via an electronic bulletin board, have been archived at:

http://www.tak.schule.de/amvoices.htm

Based upon the author's five years of experience in American-German K-12 email exchanges, the American exchange students in this pilot program appeared to notice things while in Germany that native students would not notice or would not recognize as worth sharing. This was the general finding of the pilot Virtual Exchange Program, which sought to multiply the positive intercultural learning that takes place when students are able to study and live abroad.

Plans

This spring (2001), the Virtual Exchange Program pilot sponsors would like to expand the program to include more Americans, both at home and abroad. They would also like to begin to build a program for German students of (American) English to electronically correspond with German students on exchange programs in America.

The Virtual Exchange Program, as piloted, may eventually become a comprehensive website that allows students in America and Germany to find "virtual connections" to students on exchange in the target culture. The website would offer both links to information about U.S. states and German Bundeslaender, as well electronic bulletin boards creating electronic access to exchange students in those regions.

An Overview of Information Technology on K-12 Education in Taiwan

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Abstract: Under the support of the government's National Information Infrastructure project, ease of Internet access has increased dramatically at all levels of schools in Taiwan in recent years. In an effort to speed up preparation of tomorrow's teachers to use technology (PT3), the Ministry of Education of Taiwan has launched several multi-million U.S. dollar projects to facilitate and to promote the use of information technologies in the classrooms and in teaching across all subject areas. Those national efforts are directed at improving networking infrastructure, the computing environments, the digital educational resources, and on teacher training. In this paper, we will report the endeavors undertaken, the accomplishments, the current and on-going PT3 related projects in Taiwan and discuss the issues that have emerged.

Introduction

Under the support of the government's National Information Infrastructure project, ease of Internet access has increased dramatically at all levels of schools in Taiwan in recent years. In an effort to speed up preparation of tomorrow's teachers to use technology (PT3), the Ministry of Education (MOE) of Taiwan has launched several multi-million U.S. dollar projects to facilitate and to promote the use of information technologies (IT) in the classrooms and in teaching across all subject areas. In 1999 alone, over $200 U.S. million dollars were subsidized to expedite the process of modernizing all K-9 schools with IT equipments and to broaden the scope of teacher IT trainings. On the infrastructure side, all K-12 schools (3555 in all) now have at least one multimedia PC lab. Furthermore, all are connected to the Internet. Funding is also being appropriated to install IT equipments in all the classrooms. On the teacher training side, several venues are being explored to increase teachers' IT awareness and proficiencies. Lastly, collaborative effort among 80+ selected K-12 schools has been under way since early 1998 to amass educational resources in various subject areas, making Chinese instructional resources readily available on the Web. It is hoped that with the aid of computer technology, the educational resource gap between urban and rural schools may be bridged. In this paper, we will report some of those projects and the issues that were encountered.

Current State of NII for K-12 Schools

Information Infrastructure

1. All K-12 schools are connected to the Taiwan Academic Network (TANet).
2. K-12 schools to TANet Bandwidth: using ADSL technology, upload at 384Kbps, download at 1.5Mbps.
3. TANet Backbone Bandwidth: OC-3 (155Mbps) around the Taiwan Island.
4. TANet to Internet Bandwidth: One T3 (45Mbps) and two T1 (1.544Mbps) trunks to the U.S.

Instructional Computing Equipment at K-12 Schools

1. PC Lab: For each K-12 school, there is one PC lab per 35-40 classes. The PC lab is equipped with enough multimedia PCs, typically 25 to 40, so that every student in the class can have access to one PC. Each PC lab is also equipped with at least one scanner, one digital camera, one laser printer and an instructional broadcasting system. (Project completed in June 1999)

2. IT enabled classrooms: For each regular classroom, installation of one PC/Notebook and one LCD projector/digital TV is being planned. In addition, those PCs/Notebooks will be connected to the campus network so that access to the Internet is possible.

Digital Content Resources for K-12 Teachers and Students

1. CAI software: The MOE sponsored projects have develop over 650 CAI/CAL titles across all subject areas to supplement classroom instructions. The project is on-going and was first initiated in February 1993.
2. NERC: The National Educational Resource Center (NERC) was set up in February 1998 to provide instructional resources for all teachers of all subject areas. Eighty K-12 and vocational schools were selected to develop Chinese instructional Web contents. Besides the instructional materials, the test banks, the other resource links, and contents on local cultures and places of interests, each school maintains a discussion forum to provide timely assistant to all users (teachers and students alike). NERC has an annual budget of U.S. $4,000,000 dollars and currently houses over 30 GB of data.
3. EduCity: EduCity provides an environment for social learning on the net. Virtual elections, distance learning courses, and electronic journals can all being offered in this virtual environment. This is an on-going project that was first initiated in July 1999.

Preparing Tomorrow's Teachers to use Technology (PT3)

1. In an effort to prepare teachers to use technology, the MOE annually sponsored on-the-job IT training courses to teachers through colleges and universities in Taiwan. These courses range from introductory hands-on courses to theoretical advanced network management courses. In 1999 alone, over 8000 teachers have taken advantage of 173 courses.
2. In the 1999-2000 school year, special funding was appropriated to all K-9 schools to provide basic IT training to all teachers and administrative staff within the school. Recent spot checks on school personnel have shown an increase of IT awareness by the teachers. However, the level of IT competency differs greatly from school to school.
3. The MOE is initiating a new project to set national norm on IT proficiency for all K-12 teachers. Upon completion of this project, all incoming teachers will need to be IT-proficient with respect to the standard set forth in this indicator. Furthermore, this indicator will also serve as a measuring stick for evaluating the effectiveness of within-school IT training. Final indicator is scheduled to be completed by June 2001.

Issues and Discussions

Being the principle investigators or project leaders of several of the above mentioned projects, we have observed several interesting issues relating to preparations of teachers to use technology in the classrooms.

1. With the MOE pressing ahead with installing IT equipments into each classroom, we need to think whether having IT equipments in regular classroom is the proper physical setting for doing IT-integrated subject teaching. Or perhaps setting up specialized IT equipped classrooms is a better way to accomplish the same goal.
2. Is regular classroom + IT equipment the proper physical setting for doing IT-integrated subject teaching?
3. What are the K-12 school administrators' views on IT integration? Do they support IT integration? What roles are they willing to play in this IT revolution?
4. What are the teachers' attitudes toward using IT in the classroom? Do they all embrace the idea? Or are they being forced upon by the administrators?
5. The second information technology in education study (SITES) by International Association for the Evaluation of Educational Achievement (IEA) has concluded that adequacy of teacher training is still the major problem faced by most nations. With the multi-million dollars projects at the national level, it is hoped that the teachers in Taiwan are more acquainted with the use of IT in their classrooms.

Evaluation of the Girls Research Opportunities in Computing (Girls R.O.C.)

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Introduction

The Department of Computer Science at the University of Louisiana conducted the NSF/Girls R.O.C. program that was a three-week summer residential project during the month of July 2000. Twenty-four middle school girls were recruited within a 90 miles radius of the campus and experienced a variety of hands-on activities that exposed them to software applications that are used in research, business, and the home. The participants lived on campus with six female undergraduate science majors that served as their mentors/counselors. Activities for the girls included the following: an orientation to campus and dormitory life, defining and developing ways in which the computer is used as problem-solving tool, and becoming familiar with ways the computer and the Internet can be used for research purposes.

Activities

During the first week students were introduced to software packages such as Windows 98, MicroWorlds, Netscape, and Office 2000. MicroWorlds served as a useful tool for introducing programming concepts to the young scholars, and facilitating hands-on experience with artificial intelligence and graphics applications. The Office 2000 Suite introduced business software packages to the participants that included a word processor, a database manager, presentation software, and spreadsheets. A camp newspaper was created using Word 2000 while PowerPoint was utilized by the four research groups to present their research findings at the closing day symposium. In addition to the classroom and lab activities, several field trips and evening seminars with outstanding scientists were conducted.

Research Groups

The twenty-four girls were divided into three research teams and assigned to a research project adviser. The research groups were: Software Engineering (SE), Data Mining (DM), and Expert Systems (ES). Software Engineering investigated the software development models and implemented a small system to familiarize the participants with proper SE techniques. The Data Mining group used Excel's data analysis tools to test hypotheses and to make inferences about their experiments. The Expert Systems group studied the area of artificial intelligence and expert systems that familiarized them with problems that are non-numeric. The solutions to these problems used the stepwise refinement method for system development. During the three follow-up visits to the ULM campus during the Fall 2000 semester, the participants have developed science fair projects and updated their web pages. The URL for the Girls R.O.C. site is http://cs.ulm.edu/~girlsroc.

Evaluation Procedures

The Computer Attitude Questionnaire (CAQ) was administered to the participants at the outset of the 3-week program (pre-survey), at the end of the 3-week program (post-survey), and 10 weeks after the completion of the program (follow-up survey). Prospective studies, such as this, are studies in which the same characteristics are measured on subjects that are followed forward through time and are referred to as repeated measures experiments.

To assess attitudinal changes over time, a multivariate analysis of variance was performed using a one factor repeated measures design. The Wilk's Lambda test statistic ($F = 2.1872$, p-value = 0.0115) indicates that differences in attitudes are present among the three survey times. Table 1 below shows the average responses, the individual F-test statistic and its associated p-value for each of the subscales.

Table 1
CAQ Subscale Summary and Test Statistics

Area	Subscale	Means			F-value	p-value
		Pre-	Post-	Follow-up		
YCCI	Computer Importance	4.0455	4.0485	4.0208	0.01	0.9889
	Computer Enjoyment	3.8131	3.7904	3.7927	0.92	0.4072
	Study Habits	3.9182	3.8932	4.1125	4.21	0.0236
	Motivation/Persistence	3.6534	3.7102	3.8438	0.94	0.4017
	Empathy	4.1500	4.1818	4.2188	2.29	0.1170
	Creative Tendencies	3.6504	3.7392	3.9319	4.44	0.0196
	Attitudes Toward School	3.1424	3.3894	3.4271	0.59	0.5612
	Computer Anxiety	3.3003	3.2630	3.3404	0.71	0.4971
	Self Concept	4.2470	4.3000	4.3375	0.50	0.6084
	General Skill Level	3.4426	3.7110	3.5893	1.03	0.3681
TPSA	E-Mail	4.1591	4.6212	4.5833	6.26	0.0050
	The WWW	3.8523	4.6136	4.4844	11.90	0.0001
	Integrated Applications	3.3333	4.3333	4.1771	14.64	0.0001
	Graphics	3.4545	4.1364	4.2500	4.67	0.0163

Significant Subscales

The subscales where significant effects over time were observed are in both the Young Children's Computer Inventory (YCCI) and the Technology Proficiency Self Assessment (TPSA) areas. Significant effects were observed in the YCCI subscales of Study Habits ($F = 4.21$, p-value = 0.0236) and Creative Tendencies ($F = 4.44$, p-value = 0.0196). According to Duncan's Multiple Range procedure, the attitudes of these students did not show any evidence of change over the 3-week program; however, when measured at the 10-week follow-up portion of this study, a significant increase in their attitudes was observed.

When considering the subscales of the TPSA, changes in student attitudes were observed in all characteristics. In each of these, the end of the 3-week program significantly improved their attitudes in the TPSA subscales and these positive changes are still present at the 10-week follow-up period. The attitudes of the participants were significantly improved in the areas of E-Mail ($F = 6.26$, p-value = 0.0050), the WWW ($F = 11.90$, p-value = 0.0001), Integrated Applications ($F = 14.64$, p-value = 0.0001) and Graphics ($F = 4.67$, p-value = 0.0163).

Summary and Conclusions

A major facet of the Girls R.O.C. program was to increase female awareness and to foster better attitudes toward the latest technologies in computer science. The CAQ subscales measure the attitudes of students as it relates to various topics. While some are closely tied to their local school environments, others relate to the confidence level with which they have gained through the exposure to technology during the three-week Girls R.O.C. program. The ratings from the surveys provided evidence that changes in the participants' confidence in using E-Mail, the WWW, Integrated Applications and Graphics were greatly improved as a result of the three-week interactive program. Furthermore, the ratings also indicated that the participants' attitudes toward technology as taught in their local environments did not change over the thirteen-week period of this study. This latter finding supports the findings of other studies about the importance of introducing female students to technology at an earlier age. As such, to affect change would mean that one would have to change the attitude of the teacher in conjunction with the attitude of the student.

Teacher and Student Attitudes Toward Computers, 1999 - 2000: Findings from a Suburban Texas School District

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Abstract: More than 500 teachers and 3,000 students were assessed regarding proficiency and attitudes toward technology in a large suburban school district in Texas. In addition, 5000 parents in the district were surveyed regarding the use of technology at home and the support for technology access in the schools. Key findings from this study are provided in this paper. Additional detail is available in a 132-page publication compiled by the authors (Knezek & Christensen, 2000).

Introduction

More than five hundred teachers in a northern Texas suburban school district completed a Needs Assessment (NeedSnap) survey, the Teachers' Attitudes Toward Computers (TAC) questionnaire, the Teachers' Attitudes Toward Information Technology (TAT) questionnaire, the Technology Proficiency Self Assessment (TPSA), and the Stages of Adoption form in the fall of 1999 and spring of 2000. The TAC and TAT measure attitudes toward computers and new information technologies. The TPSA measures skill levels within the major areas specified by the International Society for Technology in Education (ISTE) standards, while the Stages instrument records an aggregate assessment of the overall level of technology integration of the respondent. The NeedSnap measures teachers' beliefs and needs regarding technology, as well as level of classroom use. Students in grades 1-6 completed the Young Children's Computer Inventory (YCCI) while students in grades 7-12 completed the Computer Attitude Questionnaire (CAQ).

Teachers' Proficiency, Needs, and Beliefs about Technology

Analysis of the technology proficiency data indicated that professional development activities carried out during the 1999-2000 school year were highly effective in advancing the skills of teachers. The impact was strong ($p < .001$) in all four areas assessed: E-mail skills (pretest mean = 3.81, post = 4.23), WWW skills (pretest mean = 4.09, post = 4.43), classroom use of Integrated Applications (pretest mean = 3.46, post = 3.80), and incorporating methods of Teaching with Technology (pretest mean = 3.74, post = 4.02). Teachers advanced as a group approximately one stage of adoption on a six-stage scale, moving from: *Stage 4: Familiarity and confidence* (I am gaining a sense of confidence in using the computer for specific tasks. I am starting to feel comfortable using the computer; mean = 4.44) and moving toward: *Stage 5: Adaptation to other contexts* (I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid; mean = 4.86).

Teachers' general beliefs remained reasonably stable from the beginning to the end of the school year. Specific needs that changed to a great extent from the fall to the spring were: 1) a lesser need for training in how to use the computer and 2) a greater need to be trained in teaching techniques and strategies to integrate technology into the curriculum.

Student Preferences, Attitudes and Technology-Related Skills

Data gathered from approximately 1600 grades 1-6 students in eight district elementary schools indicates that high technology-integrating teachers at the first grade level rapidly influence the preference of their students toward using computers over the more passive medium of watching television. Across grades 1-3, looking at the classroom environment from a pre-post perspective, we found that among teachers who were low integrators of technology, student Attitudes Toward Computers ($p<.001$), Attitudes Toward School ($p<.05$), Computer Importance ($p<.01$) and Computer Enjoyment ($p<.02$) declined significantly from the first to the last six-weeks of school. However, the students of the teachers who had been previously identified by their principals as high integrators of technology also had a significant decline in Attitudes Toward School ($p<.02$), yet increased significantly for Computer Enjoyment

($p<.02$). The general impact of technology integrating teachers over several months, across grades 1-6, appears to have been the greatest in the area of Attitudes Toward Computers on students without computers at home.

Student dispositions as a whole tended to decline from the younger grade levels to older grades (grade 1 to grade 6). This is similar to trends found in past studies (Knezek, Miyashita, & Sakamoto, 1995; Christensen, 1997). Although all measured attitudes declined, the three indices related to computers declined less across grade levels than other learning-related dispositions.

With respect to student dispositions by gender, girls were significantly higher than boys in Empathy ($p<.001$), Computer Enjoyment ($p<.05$), Attitudes Toward School ($p<.001$), Motivation to Study ($p<.05$), and Study Habits ($p<.001$) as of fall 1999. During spring 2000, the girls remained significantly higher than boys in Attitudes Toward School and Empathy, while boys became significantly higher in Motivation.

Based on information gathered from approximately 1400 students in grades 7-12 during 1999-2000, secondary school students appear to have positive attitudes toward information technology and most learning-related dispositions. Their information technology skills showed healthy growth during the 1999-2000 school year, to a point where they approached the level of their teachers. Their relatively-low (and declining with increasing age) ratings on attitudes toward school are consistent with studies conducted at the elementary school level and findings from earlier studies using the same scales (Christensen, 1997; Knezek, Miyashita, & Sakamoto, 1995).

Parent Access to Information Technology

Five thousand ninety-three (5,093) surveys were completed by parents of elementary, middle, and high school students from the district's 12 schools during the fall of 1999. Most parents reported having access to a computer (93%) and the Internet (82%) at home and making the same facilities available to their children. Parents indicated broad-based support for the idea of accessing school-based information electronically, and the idea of students enrolling in web-based courses was well received. The majority of these parents appeared to be immersed in the technology of the information age.

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Teachers and Students' Attitudes Toward Computers in México
Results of Phase 2000

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Introduction

The year 2000 marks a three-year Mexican contribution to the International PLANIT study, and is now focused on the attitudes toward the computer and related topics of Mexico City Secondary School Teachers and Students. In previous years our samples included the countryside and various cities from around the Country, but researchers realized that the condition and the context of teachers and students of such a big metropolitan area as México City were special and so those individuals were being under-represented in our study. The administration of instruments was conducted during the Spring of 2000 (May-June) by the same researchers who have been participating in these series of studies since 1998. The results showed a few surprises but most of them supported the previous data.

Sample

There were 762 teachers (Male=324, Female=438) and 753 students (Male=385, Female=368) from three different School Systems: Public Regular, Public Technical and Private Schools of the México City's 16 political districts.

Instruments

In order to measure the attitudes, two instruments were administered: The *Teacher's Attitude Toward Computer Questionnaire* (TAC, Knezek & Christensen, 1996) and the *Computer Attitude Questionnaire* (CAQ, Knezek & Miyashita, 1994), validated for the Mexican population (Morales, Turcott, Campos & Lignan, 1998; Morales, 1999).

TAC's six factors were: a) Enjoyment / Utility; b) E-mail; c) Frustration / Anxiety; d) Learning / Productivity; e) Positivity / Negativity, and f) Negative Impact of Computers. CAQ's six factors were: a) Enjoyment; b) E-mail; c) Frustration / Anxiety; d) Preferences; e) Self-Learning, and f) Empathy.

Variables

The most important variables selected for the analysis of Teachers' TAC were: Age, Gender, Computer at Home, Internet at Home, Years of Service, Computer Experience, Frequency of Use, School System and Stage of Adoption. On the other hand, the selected variables for the CAQ analysis were: Age, Gender, Computer at Home, Internet at Home and School System.

Results

In terms of the general results, we found a favorable attitude toward computers among teachers and students of México City, as previously found in 1998 and 1999. On the other hand, the access to technology was much higher than last year's teachers and students of the rest of the Country:

	Teachers 1999	Students 1999	Teachers 2000	Students 2000
Computer at H.	33%	21%	64%	64%
Internet at H.	8%	6%	30%	40%

In terms of frequency of computer use by teachers, the daily and weekly use were higher than last year's, although the occasional use remained the same:

	Daily	Weekly	Occasionally
1999	12%	16%	40%
2000	22%	26%	40%

ANOVA Results

Teachers

Across factors, the most significant variables responsible for the differences were:

- *Gender*: Male teachers seem to be more positively oriented toward the computer;
- *Stage of Adoption*: Teachers in the Application and / or Integration stages seem to perceive more positively the computer than those in the Conciousness stage;
- *Computer Experience*: Teachers with experience of five years or more using computers seem to have a better attitude than those with no experience;
- *Frequency of Use*: Teachers in daily use seem to be more positively oriented toward the computer than those who use it occasionally.

The big surprise in these data was the Gender variable, which marked differences in all factors, and yet in 1999 no differences were found. On the other hand, *Adoption of Technology* seemed to be related to computer experience, frequency of use and level of technology training.

Students

In contrast with the teachers' results, students showed only a few differences, and not very consistent across the factors. Only two variables had more than one difference:

- *Age*: 18 year old students rated higher than those 17 years old in Self-Learning, while 13 year old students rated lower in Frustration / Anxiety than those 18 years old.
- *School System*: Students from General Secondary Schools rated higher in E-mail and Computer Enjoyment than those from Private Schools.

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Preservice Teachers' Attitudes Toward Information Technology in Brunei

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Introduction

Brunei is one of the 35 countries in the world that has a population of less than half a million and is categorized as a micro-state. The country is situated on the northwest coast of Borneo with an area of approximately 5700 sq.km. According to the 1999 census the population of Brunei stands at 331,000. The University of Brunei was established in 1985 and the number of students enrolled in the university reflects the small population of the country. Teacher training is a major thrust of the Institute of Education within the university and each year 100-150 students are taken in for the three year certificate training program. Female students tend to choose teaching as their profession.

The formal school system in Brunei has adopted a 6-3-2 pattern. 6 years of primary education (Grade 1 - 6), 3 years of lower secondary education (Form 1, 2 & 3), 2 years of upper secondary education (Form 4 & 5).

The language of instruction at the secondary level is English. At the end of Form 5, General Certificate of Education (GCE) 'O' level examination is conducted. Subjects covered in this examination include English, Malay, Mathematics and pure science subjects such as Physics, Chemistry, Biology, Combined Science, History, Economics and Geography.

Not all students use computers at school and the students who participated in the survey are average students. Elite students go abroad to study Medicine, Law and Engineering subjects.

Brunei has good communication infrastructure and BRUNET, the only Internet service provider has 14,000 users. In a country with only 70,000 household, this figure translated into 20% of the population who are using Internet.

Findings Regarding Teachers' Attitudes Toward Computers

One hundred forty-eight first year teacher education students completed the Teachers' Attitudes Toward Information Technology (TAT ver. 2.0) semantic differential scales of Electronic Mail (EmailT), World-Wide Web (WWWT), Multimedia (MMT), Teacher Productivity (ProdT) and Productivity for Classroom Learning (ProdCL) during 1999. Internal consistency reliabilities for the scales compared very favorably with those reported for USA data by the authors of the instrument (Knezek & Christensen, 1998). For the Brunei data, Cronbach's Alpha ranged from .90 to .92 for the individual scales. Mean ratings for most new information technologies were quite positive. No significant differences were found among the university students on any of the five measurement indices based on gender or arts versus sciences as a major field of study. Few differences among the students were found with respect to various background variables. One interesting exception to this trend was the students' perceptions of how useful the computer would be for student learning in the classroom. If the Brunei students had a computer at home they were fairly positive in their beliefs that the computer would be useful for student learning in the classroom (5.88 on a scale of 1 = least positive to 7 = most positive), but if the university students had no computer at home they were even more positive (6.20 on a 1 to 7 scale). The difference between the two groups reaches statistical significance ($f = 4.36$, $p = .038$). Perhaps the most significant finding from the Brunei pre-service educators, overall, is their overwhelmingly positive attitudes about teaching and learning with technology, which appears to vary little based on gender, field of study, or even access to technology at home.

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Findings from Thailand for the Longitudinal Assessment of New Information Technologies

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I. Student Attitudes' toward computer CAQv5.22 (Thai Analysis)

- Targeted population: Students in grade 8th from 3 schools.
- Data collected on July-August 2000 1768 cases (721 boys, 1047 girls)
- School 1 Chonchai Secondary School – 519 cases (364 boys, 155 girls)
- School 2 Chonkanya Secondary School – 672 cases (6 boys, 666 girls)
- School 3 Rayong Witayakom Secondary School 738 cases (357 boys, 381 girls) Doing analysis on 9 areas

Table 1
Summary of Findings

Attitude	Mean (total)	School 1	School 2	School 3	
CI – computer important	3.88	3.8138	3.9530	3.84	Male 3.8223
					Female 3.8567
CJ – computer enjoyment	3.91	3.9269	3.9454	3.86	Male 3.8595
					Female 3.8691
CM- motivation/persistance	3.61	3.5958	3.6672	3.56	Male 3.5563
					Female 3.5725
SH – study habits	3.75	3.7574	3.8218	3.70	Male 3.6582
					Female 3.7447
CE – Empathy	3.87	3.6422	4.0601	3.81	Male 3.6442
					Female 3.9677
CT- Creative Tendency	3.60	3.6021	3.6415	3.55	Male 3.5973
					Female 3.5210
SC – school	3.52	3.4766	3.5433	3.51	Male 3.4383
					Female 3.5968
ANX – Anxiety	3.69	3.7066	3.6929	3.68	Male 3.6121
					Female 3.7388
E-mail	3.56	3.5711	3.5811	3.53	Male 3.5155
					Female 3.5445

Analysis: t-test and ANOVA

- Comparison of gender in co-educational school: significant differences in these areas of Computer Enjoyment, Empathy, School, and Anxiety . Girls tend to have better attitudes in these areas
- Comparison of gender in all three schools: significant differentees in: Computer Importance, Computer Enjoyment and Empathy also girls tend to higher attitudes in these areas.
- Comparison school types: significant differences in these areas: Computer Importance, Computer Enjoyment, Motivation/persistance, Study Habits, Empathy and creative tendency. Non-coeducational schools for girls have more positive attitude than either the non-coeducation schools for boys or the co-education school.

II. Teachers 'Attitudes using TAC (ver 4.0)

- Targeted population: teachers representing every subject taught in the above three schools.
- School 1 Chonchai Secondary School 101 teachers (33 males, 58 females)
- School 2 Chonkanya Secondary School 72 teachers (12 males, 58 females)
- School 3 Rayong Witayakom Secondary School (37 males,55 females)

- Analysis (using the Scoring TAC v3.0) into 7 areas: Computer Importance, Computer Enjoyment, Anxiety, Enthusiasm, Productivity in the classroom and E-mail.

Table II
Comparison of Teacher Attitudes

Attitudes	Means N=270 M=82,f=171		School 1 – ChonChai n=101 M=33,F=58		School 2 - ChonKanya n=72 M=12,F=58		School 3 - Rayong n=97 M=37,F=55	
CIMP importance f16.13 =caq	3.82	M 3.75	3.87	M 3.81	3.85	M 3.74	3.75	M 3.70
		F 3.87		F 3.96		F 3.88		F 3.78
CENJ enjoyment=caq	3.44	M 3.40	3.42	M 3.30	3.44	M 3.45	3.47	M 3.46
		F 3.47		F 3.50		F 3.45		F 3.47
CANX anxiety=caq	3.45	M 3.41	3.40	M 3.34	3.41	M 3.40	3.52	M 3.48
		F 3.47		F 3.43		F 3.44		F 3.55
CENT enthusiasm f16.1	3.70	M 3.70	3.73	M 3.69	3.66	M 3.61	3.71	M 3.76
		F 3.70		F 3.75		F 3.69		F 3.68
PINC productivity in the classroom f16.6	3.97	M 3.93	4.07	M 4.04	3.91	M 3.75	3.93	M 3.88
		F 4.00		F 4.10		F 3.94		F 3.95
PROD productivity	3.66	M 3.64	3.73	M 3.69	3.63	M 3.47	3.61	M 3.64
		F 3.67		F 3.75		F 3.66		F 3.59
EMAIL e-mail	3.42	M 3.49	3.47	M 3.46	3.47	M 3.55	3.34	M 3.49
		F 3.39		F 3.50		F 3.44		F 3.23

Results

- Gender: There found no different attitudes in these areas between males and females teachers.
- Frequency of Use: Teachers who daily use have better attitude.
- With the results of this serveys found that 56 % have computer at home and 17% use internet at home.
- Only 7% use computer Daily, 9% use weekly , use occasionally 25% and do not use 59%.

III. Faculties Attitudes' toward IT (FAIT v1.1)

- Targeted population: Faculty representing Colleges of Education from universities:
- Chulalongkorn University , Bangkok received 64 cases from 173 faculties
- Kasertsat University, Bangkok received 32 cases from 110 faculties
- Prasarnmith University, Bangkok received 41 cases from 129 faculties
- Burapha University, Chonburi received 38 cases from 63 faculties
- Data were analysis into 5 factors acording to the scoring of FAIT1.1

Table 3
Comparison of Faculties

Factors	Mean N=175	Mean-U1 n=64	Mean-U2 n=32	Mean-U3 n=41	Mean-U4 n=38
F1 enthusiasm/enjoyment	3.90	3.90	4.02	3.81	3.90
F2 anxiety	3.77	3.75	3.88	3.69	3.80
F3 avoidance	3.39	3.38	3.46	3.36	3.37
F4 e-mail Classroom	3.51	3.58	3.48	3.39	3.57
F6 productivity	3.71	3.77	3.63	3.66	3.74

- Education Ph.D. (94 people, 53.7%) Masters (79 people, 45.1%) Bachelors (2 people, 1.1%)
- Age are vary the most frequency are more than 55 years old -thirty percent.
- Anova Results

1. Education: Faculties who earn higher degrees have better attitudes and have less anxiety about computers.
2. Middle-aged faculties (35-49) have a better attitude, less anxiety toward, and better enjoyment of computers and information technology; and a better appreciation of using e-mail in the classroom than older faculties.
2. Faculties who use computers more often have a better attitude than those who use computer less.

Multimedia in Chinese Elementary Schools

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Abstract: Multimedia describes any system that unites two or more media into a single product or presentation. Along with the increasingly developed computer technology, it is believed that multimedia is the best single set of technologies to promote among teachers to improve the way they educate students. Facing the challenge of large-sized classes and lack of multimedia resources, Chinese teachers have made an impressive progress in using multimedia in their classrooms. They are taking the advantages of national centralized curriculum, design and develop multimedia courseware to accompany with the textbooks. Collaborating with media specialists, they have been directly involved in multimedia courseware development. Supported by administrative bodies, they participate in training, enrich their own technological skills, and utilize multimedia to improve teaching and learning. The schools, like Danyang Experimental Elementary School, Yangzhou International Elementary School and Nanjing's Beijing East Road Elementary School are setting up a good start, although there still exists a great unbalance in utilizing advanced computer technology among Chinese schools and teachers.

Multimedia describes any system that unites two or more media into a single product or presentation (Lockard, Abrams and Many, 1997). In the field of education, multimedia has been used to describe audio-visual teaching aids since the early 1960s, almost twenty years before microcomputers entered the classrooms. Today, multimedia has become closely associated with the computer-based, instructional delivery systems for improving teaching and learning (Poole, 1997). Multimedia encapsulates works, pictures and numbers in many ways such as full motion video, still images, text and sound to make the delivery more meaningful. Along with the increasingly developed computer technology, it is believed that multimedia is the best single set of technologies to promote among teachers to improve the way they educate students. However, multimedia is one of the instructional vehicles, it is only an instructional tool. Its effectiveness does not solely depend on the multimedia itself, but its users, teachers and students. Of course, there is a certain excitement in promising new ideas and powerful innovations that allow teachers and students to explore the multimedia instruction and learning, but little research has been done on the effectiveness of teaching and learning with multimedia environments (Grabe and Grabe, 1998). From a global perspective, this paper is to examine the implementation of multimedia in Chinese elementary schools to see how multimedia assists teaching and learning in the large-sized classes that are usually as three times large as those in the United States.

> Fifty-four third graders have entered the classroom sitting at the desks in rows. The teacher is standing in front of the class getting ready to deliver the instruction. Multimedia station including a Pentium III multimedia computer, a VCR, a data projector, and speakers is in function for the class to use. This is a third-grade Chinese language class to be delivered with multimedia implementation in an elementary school in Southern China. Following the respect greetings "Good morning, teacher!" and "Good morning, class!" the teacher states the purpose of the instruction that they would have the lesson of "The Lotus" on that day. The teacher brings up a few questions about the

knowledge of lotus and asks students to describe their experience in the park and what they have seen on the lake, but only few students can give satisfactory answers. The teacher then turns on her multimedia station and the projector. Beautiful animated lotuses are projected on the screen and lovely soft music is played. The texts in Chinese are highlighted and read with excellent standard Chinese tone. Obviously, the fifty-four children have been highly motivated to learn about "The Lotus." With three key words, "smell," "look" and "think," the teacher facilitates the discussion about the characters of the lotus and its symbolic meanings towards human being. Honesty, collaboration, and the value of life are integrated in instruction and learning. The animated images are paused while the discussion is in progress. Students read aloud after the narrator along with the textures displayed on the screen. The teacher guides individual silent reading and integrates listening, speaking, reading, and writing activities in the classroom with the aide of multimedia presentation. Within this multimedia-learning environment, students have had group discussion, participated in a dramatic play, and actively involved in various learning activities. Corresponding to the learning outcomes, students have mastered the reading of the text and completed creative paragraph writing with the phrases and sentence structures learned in the class within a fifty-minute lesson.

Clearly, it is a very successful lesson. Technology is no longer an individual showcase, but a common tool to improve teaching and learning in Chinese elementary schools. Based on the recent visits to Danyang Experimental Elementary School, Yangzhou International Elementary School and Nanjing's Beijing East Road Elementary School of the People's Republic of China, it has been found that multimedia has been successfully implemented in the classroom teaching. The success is evidently attributed to the matching of the contents of multimedia courseware and the contents exactly being taught in the class, instructor's involvement in designing and developing multimedia courseware, and the emphasis of teacher's technology training and implementation in the classroom.

The contents of multimedia courseware packages

The Chinese schools have a national centralized curriculum, unified textbooks, and an emphasized mastery of learning. Although multimedia resources in Chinese elementary schools are comparatively fewer than that in the United States, it is found that the contents of limited numbers of multimedia courseware packages utilized in the classrooms are directly matching with the contents of school textbooks. The courseware "The Lotus" that the third grade teacher has implemented in her class is one of the good examples. It is designed and developed specially for the text version of "The Lotus" in third-graders' textbook. Its images, textures, and audio features serve the needs of teaching and learning in the classroom. With the implementation of that multimedia courseware in the classroom, students can be highly motivated to learn how to read, talk and think. The multimedia has integrated "listening, speaking, reading and writing" activities for a successful language arts class. To name a few more, "Bei de Ren Shi " (The Understanding of the Times of) and "Yuan de Mian Ji " (The Area of the Circle) are also excellent examples of matching the contents between courseware packages and textbooks. "Bei de Ren Shi " is a multimedia courseware to help younger children understand the concept of "times" and to learn how to solve problems of the "times". The contents of this courseware match exactly the contents of the section one, unit six in the second graders' mathematics textbook. When given the information that a squirrel is three years old and is three times younger than an elephant, the second graders can figure out effectively how old the elephant is with the assistance of that multimedia courseware. "Yuan de Mian Ji " is designed to illustrate the concept of circles and to facilitate six-grade students to learn how to measure and calculate the area of a given circle and to learn how to solve related math problems. Again a good match of the content areas between the courseware and the textbook is found. The contents of the courseware, "Yuan de Mian Ji " are closely connected to the contents of the section two, unit four in the sixth graders' mathematics textbook. This type of matching nature promotes teachers to consider the implementation of multimedia courseware in their teaching, assists teachers to achieve their instructional objectives, and facilitates the process of improving students' learning achievements.

Teachers' involvement in multimedia courseware development

In China today, government education commissions at all levels, county, city and province, encourage teachers' involvement in multimedia courseware development and support such development by rewarding and honoring excellent courseware packages and their developers. This administrative action has greatly motivated teachers to be involved in multimedia courseware design and development. Chinese teachers have been involved in the design of most multimedia courseware at different academic levels, though with limited multimedia resources. In some Chinese elementary schools, teachers have learned to use such multimedia-authoring tool as Authorware to design and develop multimedia courseware collaborated with media specialists. The courseware "The Lotus," "Bei de Ren Shi " (The Understanding of the Times of) and "Yuan de Mian Ji " (The Area of the Circle) are all the products of the collaboration between the teachers and the media specialists. Danyang Experimental Elementary School organizes a multimedia teaching demonstration and discussion every month, conducts a multimedia courseware development-competition every semester, and compiles a faculty's essay collection every academic year. Yangzhou International School and Nanjing's Beijing East Road Elementary School encourage and support teachers to participate in the courseware exhibitions on campus, submit their products to city, provincial and national competitions. All these three schools today own multimedia courseware developing labs where teachers can contribute their expertise of teaching and practice on courseware design and development. Each campus has networked cable TV, language labs, and multimedia classrooms. Teachers share with each other their multimedia resources and implement the courseware developed by themselves into their classroom teaching and learning. Campus radio on the other hand helps reinforce the multimedia implementation at each school. As a result of teacher involvement in multimedia courseware design and development, multimedia courseware implementation in elementary schools in China has turned out to be quite a success. Because of the direct involvement, teachers know what they need in the classroom and know how to teach with the integrated multimedia.

The emphasis of teacher training and the implementation strategies

Computer technology, no matter how advance it is, it is an instructional tool; using multimedia, no matter how exciting we feel, we should know how to use it effectively. Like many middle schools and universities in China, Chinese elementary schools have put teachers training on the agenda and emphasized the effective implementation. The school knows that it would become a formality of using technology in the classroom if there had not a team of teachers who were education technology literate. In the past two years, all teachers in Jiangsu province have been required by provincial educational commission to receive training in technology and to pass the technology competency tests. The competency tests include primary level, intermediate level and advanced level. A majority of teachers attend the training classes at weekend, during holidays or summer vocations; a few of them go with self-study track. Out of the training, teachers devote their after-school time, entertainment time and even their valuable dating time to practice at computers. It is told that all teachers in Danyang Experimental Elementary School, Yangzhou International Elementary School and Nanjing's Beijing East Road Elementary School have passed their primary competency tests, quite a number of them are at the medium level and a few have reached advanced level. The purpose of receiving training is to use technology in the classroom. Teachers in the schools mentioned above are encouraged and supported to implement their new technological skills in classroom teaching. This type of implementation has put the emphasis on the clear instructional objective(s), integrated learning activities, and students' academic learning achievements. In schools, implementation strategies are discussed, models of teaching with multimedia aides are demonstrated, and teaching experience is shared among teachers in a timely manner. It is clear that the teacher training and the emphasis of student learning achievement have made the multimedia implementation become more meaningful and effective.

In summary, facing the challenge of large-sized classes and lack of multimedia resources, teachers in China have made an impressive progress in using multimedia in their classrooms. They are taking the advantages of nationally centralized curriculum to design and develop multimedia courseware to accompany with the textbooks. Collaborating with media specialists, teachers have directly involved in multimedia courseware development. Supported by administrative bodies, teachers are encouraged to

participate in training and enrich their own technological skills and utilize multimedia to improve teaching and learning. Schools like Danyang Experimental Elementary School, Yangzhou International Elementary School and Nanjing's Beijing East Road Elementary School are having a good start; however, there is one thing needs to be pointed out that these three elementary schools are all key elementary schools in China. They have more funding resources and can afford the cost of hardware, software, training and follow-up support. They also have more advantages to recruit excellent faculty and staff members as well as students. For the majority of elementary schools in China today, there is still a long way to go to implement multimedia in classrooms. There exists a great unbalance in utilizing advanced computer technology between schools, as well as among the teachers. The reality is that quite a number of Chinese elementary schools do not have multimedia classrooms and labs. Some schools do not even have a computer yet. In those schools, teachers have not had an equal access to the advanced technology and students still rely on the textbooks and pencils. But what is happening at Danyang Experimental Elementary School, Yangzhou International Elementary School and Nanjing's Beijing East Road Elementary School today will be seen in other Chinese elementary schools soon along with the advances of computer technology and political-economic reform in China.

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An introductory internet skills program for teacher education: or from practice to theory: a case study

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Abstract: This case study presentation will report on how the presenters successfully responded to the 'just-in-time' challenge of putting together an inservicing 'introductory technological skills' course for a 'difficult' group of teachers. The particular course which will be the focus of the presentation provided the specific opportunity for the two presenters to bring together their convergent but differing international experiences in teacher education to try and distil the key principles and practical requirements for developing an effective introductory internet skills program. Although many of the students undertaking this course began with little knowledge of computers let alone the internet, they all achieved in a short time (2 hours X 14 weeks) a basic and convergent competency in a range of generic internet skills: internet communications, online information literacy using browsers and search engines, developing animated powerpoint presentations and webpage learnaing resources, and other associated skills like FTPing and scanning graphics. Indeed, some of the initially less confident and even reluctant teacher-learners quickly became adept at using what for them was a completely new medium.

In other words, the presentation will cover some of the approaches, methods and activities used to transform reluctant or intimidated learners into keen users of the internet. This session will identify and discuss the kinds of simple practical skills and activities that can be linked together in progressive contexts of applied, relevant, and even 'real-life' learning to achieve a 'spiral curriculum' of effective reflective practice using the internet. The organization of the presentation will be as follows:

(i) an initial outline of the *context* of the challenge faced by the presenters;

(ii) an overview of how the presenters *responded* by developing this particular program in terms of 'show-and-telling' teacher-learner artifacts, anecdotes and other action research data;

(iii) a *reflection* on the course as case study, and about the key principles or strategies and kind of activities required to conduct an effective introductory internet skills course.

Note that this is an abstract for a Presentation which will complement two other papers by the presenters – 772 and 1033

An Instrument to Measure Malaysian Teachers' IT Preparedness

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Abstract: The Malaysian Ministry of Education plans to turn approximately 10, 000 primary and secondary schools into Smart Schools by the year 2010. This means that in the next decade, all teachers must be fully prepared to teach in all the Smart Schools nation-wide. The pressure on teachers has, therefore, become urgent. For this reason, there is a growing educational interest in the assessment of teachers' IT preparedness. In this paper, we examine the need to develop an instrument that is able to assess teachers' IT preparedness. IT preparedness in this study is measured in three domains: the teachers' actual IT skills, their knowledge about IT and their attitudes toward IT. We also describe what the instrument attempts to measure, how it is administered and present results of phases one and two of the study.

Introduction

Malaysia is considered to be one of the fastest developing nations in South East Asia. Indeed, it has a national ambition called Vision 2020, the purpose of which is to attain developed-nation status by the year 2020 (Mahathir, 1998). To achieve the substance of Vision 2020, the government has set up a blue print for the Multimedia Super Corridor (MSC). The MSC is a massive 750-square-kilometer high-tech information zone encompassing the Kuala Lumpur City Center (KLCC), Putrajaya (administrative center) and the Kuala Lumpur International Airport (KLIA). The infrastructure of the MSC area emphasises what the Prime Minister has described as providing high-powered networking, efficient transportation, satellite telecommunications and intercity connections. To spearhead the development of the MSC and give shape to its environment, seven initiatives for multimedia applications have been identified. These initiatives are borderless marketing, smart schools, electronic government, multi-purpose card, telemedicine, research and development as well as worldwide manufacturing webs. Of these, the smart school initiative is regarded by the Prime Minister as a specific response to Malaysia's need to make the critical transition from an industrial economy to a knowledge-based society (Mahathir, 1998). This initiative will enable Malaysia to produce skilled people who will be able to harness the benefits and the potential of IT needed to attain the "smart" Malaysian society in 2020.

The Need to Measure Teachers' IT Preparedness

The pilot Smart Schools that started operation in 1999 will act as a nucleus for the future Smart School teaching concepts and materials, skills and technology. By the year 2010, if the 1997 planning is followed, all 10,000 of Malaysia's primary and secondary schools will be Smart Schools (Smart School Project Team, 1997). This means that in the next decade, the entire population of approximately 450,000 teachers in Malaysia must be fully prepared to teach in all the Smart Schools nation-wide. The pressure on teachers to become IT literate as well as to understand the education implications of the new technology has, therefore, become urgent. It is now envisaged that all teachers will become skilled in the use of IT and the integration of IT in the teaching-learning process (Smart School Project Team, 1997). This is important because all teachers will have to use IT in the classroom. However, before they can integrate this new technology, these teachers must be trained to be skilled and be knowledgeable about IT with the right attitudes.

The Smart School Project Team (1997) stressed that a comprehensive teacher education programme incorporating best practices in technology supported learning will be critical to the success of the Smart School concept. The training will enable teachers to carry out their responsibilities as facilitators in the classroom, as they will be equipped with specific IT skills and knowledge as well as with the right kind of attitudes. For this reason, teachers must be assessed thoroughly by the educational authorities before they teach in schools to determine if they are IT prepared. With the implementation of Smart Schools nationwide, there is a growing educational interest in the assessment of teachers' IT skills, knowledge and attitudes. An instrument, therefore, is needed to assess Malaysian teachers' IT preparedness.

Theoretical Framework

Evidence supported by the Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989), Adaptive Control of Thought (ACT) theory (Anderson, 1983), and Wilson's (1990) framework has substantiated the claim of this research that these three domains (skills, knowledge and attitudes) should be measured to represent IT preparedness.

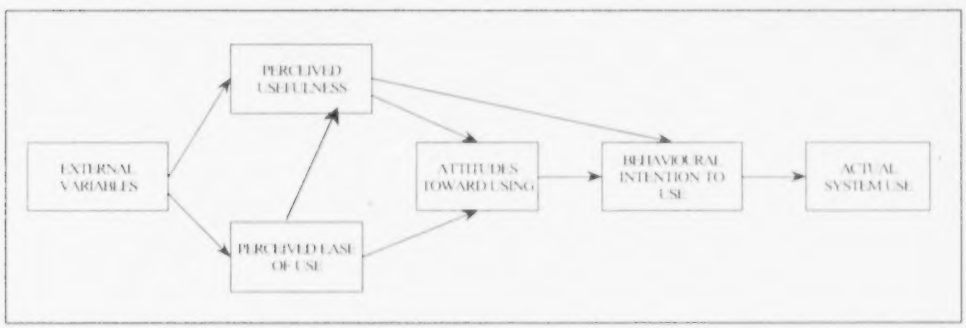

Figure 1: The Technology Acceptance Model

Davis et al. (1989) strongly suggested that the TAM can explain the usage of IT (Fig. 1). This model has strong influences of Fishbein and Ajzen's (1975) theory of reasoned action. It shows that beliefs influence attitudes, which in turn lead to behavioural intentions and ultimately the actual system use. Suffice to say, this model posits that actual system use is determined by the user's attitudes toward it. The actual use can be measured in terms of the user's performance or more specifically the knowledge and skills of the system (Speier et al., 1997).

The ACT theory by Anderson (Anderson, 1983) explains how cognitions can produce action. The ACT theory is one of the most influential explanations of skills acquisition in cognitive psychology. Essentially, Anderson distinguished the learning skill in relation to two different types of knowledge that are:

- Declarative knowledge which consists of facts about the world which can be put into words;
- Procedural knowledge which refers to how we do things.

Anderson (1983) suggested that the first cognitive stage of learning involves acquiring declarative knowledge that is relevant to the skill. Preece et al. (1997) likened this stage to learning a computer. Examples of this stage include activities such as memorising things to select an option from a menu, moving the cursor to the required option using the mouse and then clicking twice rapidly in succession on the mouse button.

From the acquisition of declarative knowledge, an associative stage occurs which connects the different elements needed for performance. The elements are strengthened at this stage (Anderson, 1983). This would include things like learning how to move and 'double click' the mouse.

Lastly the autonomous stage comes into play where the skill becomes more automated and rapid (Preece et al., 1997). The declarative knowledge becomes second nature to the performance of the task and ceases. According to Preece et al. (1997), learning to use a computer system, therefore, can be viewed in terms of the acquisition of a skill where declarative knowledge changes into a skill.

Wilson (1990) somehow made the connection between the three variables when he stressed that teachers' IT preparedness should be measured in terms of skills, knowledge and attitudes.

The Instrument

The instrument is constructed in our national language, Bahasa Malaysia. Three domains are measured in this instrument. They are skills, knowledge and attitudes. The instrument comprises Parts A, B and C. Part A is paper based while Parts B and C are web based. Part A of the instrument measures the teachers' actual IT skills. The skills are measured in terms of the teachers' ability to execute a series of 74 tasks. Most of the tasks are based on the North Carolina State Board of Education's Educator Technology Competencies (North Carolina Public Schools Info Web, 1999). The North Carolina Board's Educator Technology Competencies are used because Malaysian authorities have recommended no detailed or clear competencies.

The tasks are measured in two dimensions. The first dimension comprises content categories pertaining to productivity tools (word processing, spreadsheet, database and presentation), World Wide Web (WWW) and electronic mail while the second dimension comprises task categories (basic operation, management and design).

Part B measures the actual knowledge about IT. It is measured in terms of 25 multiple-choice questions. Of these, two items are adopted from Deakin (1998). The questions are constructed in two dimensions. The first dimension comprises system hardware, system software, WWW and electronic mail while the second dimension comprises the three lower levels of Bloom's Taxonomy.

Lastly, Part C measures the teachers' attitudes toward IT and consists of two dimensions as well. The first dimension consists of specific software applications, software applications in general, computer and IT in general. The second dimension consists of confidence, usefulness, anxiety and aversion. This part comprises 36 five-point Likert's scale statements. Twelve statements are adopted, translated and adapted from Loyd and Gressard's (1984) Computer Attitude Scale and Christensen and Knezek's (1998) Teachers' Attitudes Toward Computers Questionnaire (TAC).

Administration of the Instrument

Two phases of instrument testing were carried out. The participants for this study were student teachers from Universiti Putra Malaysia who had taken the "Information Technology in Education" course (EDU 3033).

Two sub-samples were involved in phase one. There were two assessments in phase one. The first sub-sample comprised 22 student teachers while the second sub-sample comprised 15 student teachers. At the beginning of the test, the participants were briefed about the assessment that was being carried out. We had the full cooperation of the course instructor who encouraged the student teachers to participate in the assessment. The participants were required to attempt Part A of the instrument, followed by Parts B and C respectively. Each student was given a desktop to work on, access to the Internet and a piece of diskette to save their work into. The participants were required to save their work only for Part A in a floppy diskette. The answers and responses of the participants in Parts B and C were collected via electronic mail. Both assessments took place in our faculty's computer laboratory. The assessments lasted for three hours. Participants in the first session detected several errors in the instrument. For that reason, we were able to correct the errors before the second session took place.

The revised version of the instrument after item analysis was sent for phase two. Forty-nine student teachers participated in the study. Nine and 10 out of 49 students did not attempt Parts B and C respectively as they encountered problems with the Internet connection. So they were not able to access the WWW after completing Part A. Results from phases one and two were used to calculate the internal consistency coefficients. Item revisions and elimination were also carried out based on the results of item analysis from both phases. Item difficulty was calculated for Part B while item discriminant was calculated for Parts B and C. Items accepted ranged between 0.3 and 0.9 for item difficulty and had values greater than 0.3 for item discriminant.

Results of Phases One and Two

Table 1 shows that the reliability coefficients for the subscales are high except for knowledge. The low values are expected because this subscale is measured by a small number of items. For this reason, the reliability estimates are corrected by the Spearman Brown's prophecy formula. The corrected reliability coefficients are comparatively high. The reliability coefficients clearly suggest that the instrument has high internal consistency.

Subscales of IT preparedness	Reliability coefficients		
	Phase One		Phase Two
	1st	2nd	
Skills	0.95*	0.95*	0.94*
Knowledge	0.61*	0.72*	0.74*
	0.75+	0.83+	0.85+
Attitudes	0.90#	0.95#	0.93#

*= KR 20 #= Cronbach's coefficient alpha += Spearman Brown coefficient (corrected to 50 items)

Table 1: Internal Consistency Coefficients

To ensure that the instrument will be valid and reliable, classical procedures for test construction will be closely followed in the third and fourth phases of the study.

Conclusion

IT offers great potential and benefits in the teaching-learning process. However, before the students can benefit from IT, teachers must be trained to use IT. There is great urgency to bridge the digital gap among Malaysian teachers now. Teachers, therefore, must have the right IT skills, knowledge and attitudes to reap the potential of IT. The instrument that is currently being validated can provide valuable information about the teachers' IT skills, knowledge and attitudes as well as to teacher education programmes that are working toward these competencies.

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An In-Service Program for Ecuadorian Teachers. The Innovation of Elementary Education in the Santa Elena Peninsula Project

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Abstract: The Ecuadorian educational setting promotes teaching strategies that are still built upon traditional educational models. The potential of new learning models and information technologies is neglected and little interest is shown in including ICT as a catalyst to foster innovation of education in general. This paper is about an Innovation Educational Program for elementary education in the Santa Elena Peninsula in Ecuador. The project seeks to develop creativity, critical-thinking and problem solving in primary school children with the support of ICT. A major part of the project is focused on teacher training. The study monitors and follows teachers and pupils during a 6-year period. In this paper part preliminary results of the teacher-focused studies are presented. This sub-project focused on the analysis of video materials and surveys that research the current dominant teaching - learning strategies adopted and promoted by teachers in the Peninsula Project.

Introduction

Today's society is qualified as the information society (Mojica 1999) and the people living in this society are the ones that are in the midst of a third major revolution in human civilisation (Negroponte, 1995). According to Oblinger and Rush (1997) we are living the Information Revolution. Nowadays, the volume of new information is increasing at such a rapid pace that the class of 2000 is exposed to more new data in a year than their grandparents encountered in a lifetime. Knowledge doubles every seven years and ten thousand scientific articles are published every day (Forman, 1995). Yet, are we prepared to dominate all the information surrounding us?

The exponential growing of information urge the individuals of the 21st century to move from a materialistic and physical reality to more of a mental and informational reality –the source of survival will become knowledge rather than physical capital (Lombardo, 1998.) Therefore, the man of the future is challenged to handle three abilities: a) to access information; b) the capacity of prioritise and c) to think critically and analyse the information he reaches (Mojica, 1999.) This challenge is not possible only by exposing the children to the Information and Communication Technologies (ICT), since technology by itself would not create these skills in the pupils. If we are going in the wrong direction, technology will not help us to find the right direction (Ehmann, 1995). Dede (1996) says that technology can help transform schools but only if it is used to support new models of teaching and learning. Therefore, technology will work best if it is seen as a tool, the means, and not the goal of the educational process. As Land and Coe (1998) stated: " Technology works best when learning includes the process of finding data, information or artefacts; making decisions based upon data; and communicating those findings to others. Information Technology as a tool works best when teaching includes the management of a learning environment that sets up environments in which students can work individually an in groups in data collection, decision-making, and communicating within the context of real-world tasks."

The academia throughout Universities, High Schools and Elementary Schools in general has to be committed to participate in the process of preparing the 21st century people to dominate the information age (Chiluiza & Peláez, 2000). The ones called to be the means of this challenge are educators. Teachers have to learn good practices of teaching in order to help in the transformation of new schools in places where the learner learn how to work collaboratively, inside and outside the classroom, with his/her teacher and partners, through active learning techniques and reflective learning (Chickering and Ehmann, 2000). All these characteristics go in line with the new learning

models (such as constructivistic model) which promote an active learner and a teaching – learning process centred in the pupil and not anymore in the teacher.

This paper is about the Innovation of Primary Education in the Santa Elena Peninsula (IESEP), an educational project, in rural Ecuador. The project is set up by the Escuela Superior Politécnica del Litoral (ESPOL), an Ecuadorian University and forerunner in (educational) technology. The project seeks to develop creativity, critical-thinking, problem-based learning and collaborative work in primary school children with the support of ICT. Next, the project looks for increasing the number of children that continue higher education after secondary school level. A major part of the project is focused on teacher training. A core group of teachers that receive special training - 40 from a network of 20 schools - will be in charge of the further training of all academic staff in their own and other schools. A cascade-effect will be provoked in the school system in the Peninsula region as a sustainable professional developmental model.

The software tools that are being used - by teachers and pupils - are LOGO-Microworlds and LEGO-Mindstorms. The project will gradually include Internet and databases access to the participants in the IESEP Project. In order to reach the objectives of the project the teachers of the participating children were enrolled in an educational program to train them in the use of ICT and the integration of these technologies in their classroom practices. Previously, the IESEP team needed to assess the educational and technological needs of the teachers to design an appropriate training program for the context of the Peninsula region.

Purpose

This study seeks to identify the common educational characteristics of the rural teachers of the Ecuadorian coastal region and the context surrounding these teachers. Besides, the purpose of the study is to research the current dominant teaching – learning strategies adopted and promoted by teachers in the IESEP project. Considering the educational reform that is promoted in Ecuador since 1992 is based on the social constructivistic pedagogical paradigm, the main questions to be answered are: Do the Peninsula teachers are upholders of this pedagogical paradigm? And do these teachers have a sounded understanding of what they mean by being constructivistic educators?

Additionally, the researchers wanted to identify the educational needs of these teachers; to design a targeted training based on the actual needs of the group. Thus, as suggested by Knezeck and Christensen (2000) the developed plan would move the group from a lower stage of technology integration to a higher one.

Theoretical Framework

The learning theories that frame the present study are behaviorism, cognitivism and social - constructivism. To behaviorist learning is essentially a matter of storing information for later recall. Under this paradigm the teacher plays the central role in the classroom, transmitting knowledge to learner who only have to absorb information. The student's role is reception and compliance. In this model the teacher's performance in front of students is critical, the effectiveness of teachers is evaluated for the ability to establish "effective" eye contact, use different kinds of questions, pause in explanations to allow pupil reflection, use of a variety of concepts, and redirect student questions (Marsh, 2000). These characteristics are the ones that were considered to identify a teacher as promotor or adopter of the behaviorism learning theory.

The cognitivistic school made mental processes the primary object of study and tried to discover and model the mental processes on the part of the learner during the learning-process. Knowledge under the cognitive theories is viewed as symbolic, mental constructions in the minds of individual, and learning becomes the process of committing these symbolic representations to memory where they may be processed. Eggen and Kauchack (1992) propose the following as active teaching-learning strategies that the cognitivist teacher promote in the classroom; however, the cognitivist paradigm knowledge is still viewed as given and absolute just like the behavioristic school:

- Make questions to the students, especially those questions that the students ask when they are learning.
- Make the students paraphrase the information instead of reciting it by memory.
- Construct lessons from the analysis of examples and practical applications, instead of departing from definitions.
- Solve problems

- Develop practical classes and send homework
- Write articles, essays, etc.
- Develop practical activities.
- Elaborate tests and questionnaires that require more than a simple memorisation or recall

In regard to the constructivistic theory besides Piaget, constructivists have embraced other theorist, especially the Russian psychologist L. S. Vygotsky, who considered and individual's cognitive system to be a direct result of and inseparable from social life. The individual's psychological processes are always bound to the culture in some way because the individual uses a particular "set" of cultural tools, thus mental constructs are delimited by one's culture. Is in this social level where sign mediated memory, voluntary attention, and concepts are developed on the basis of internalisation of external activities (Marsh 2000). Then, the question is how this theory influences educators and education? Educators may have greater influence in his/her students, as they concentrate most of the social pupil's time at schools. The social setting of the school and the classroom is of much greater importance than it has been generally considered in educational research and practice. Teachers can incorporate ICT to transform learning through a social context that reflects a change from knowledge transmission to student-centred learning, which promotes individual and shared construction of meaning. Computers can lever the classroom environment through co-operative learning, collaborative project-based schoolwork; thus, the resulting effect is a class where students are active, self-regulated, reflexive, involved and facilitating rather than passive spectators while the teacher plays the role of a coach, a facilitator of the teaching – learning process (Seels 1989).

Methods and data sources

In order to attain the purpose of the study surveys, interviews, class observations and video analysis were used in the research. The subjects of our investigation were 40 teachers from 20 schools of the IESEP school network.

Surveys and Interviews

Firstly a survey was distributed among 40 teachers during a meeting session and was collected the same day. This anonymous survey intended to describe the following educators' characteristics: average age, sex, years of experience, educational level, self-qualification of the learning model adopted by the teacher, attendance to continued education, previous experience with computers or technology. Additionally, the survey collected the following school context characteristics: number of students per classroom, technology infrastructure available at school or home and the way teachers select support or reference materials.

Secondly, in a later meeting a non- anonymous survey was filled-out by all the educators participating in the IESEP project. The survey contained 18 close-ended and 3 open-ended questions related to 3 close-ended questions. Each close-ended question was graded over 5; thus, a figure near 5 indicated a tendency to promote a specific type of activity. The questions were classified in 6 activities-group, each group represented a learning model or strategy promoted by the teacher.

The surveys were collected again the same day they were distributed. In this opportunity the answers found in the survey were discussed with each teacher during a later programmed interview. The purpose was to identify explicitly and deeply the type of activity promoted by the teacher in the classroom and whether the educator was able to explain the adoption of such performances. Thus, the researchers could assess the level of reflection and understanding the teacher has upon the educational practice he/she adopts.

Class Observations and Video Analysis

Through these methods the researchers went to the field to gather live-data. Ten teachers were asked to let the research team to observe and videotape their performance in the class. An observation list was accordingly designed with respect to the questions of the second survey. The list was used in order to tick activities that were or were not adopted by the teachers during the class. The video analysis was accomplished with the participation of an external researcher to do a more objective analysis.

Results

Descriptive data about the teachers and schools participating in the IESEP school network was collected through surveys; learning models promoted and adopted by teachers and level of reflection upon their teaching practice was gathered from the three methods applied in the study. These data is briefly discussed bellow.

Surveys and Interviews

The descriptive data gathered from the surveys about the teachers indicate that the majority of the IESEP teachers are men, the average age is 42, and the average teaching experience is around 19 years. Whereas the educational level 58% obtained their educational/pedagogical degree at the university and 20% followed a pedagogical training in post – high school institutes, the rest has a non-formal training in the educational area.

In reference to the learning model 43% auto-qualified themselves as constructivistic, 44% behaviorist and constructivist, 6% considered themselves as behaviorist, and 7% mentioned other paradigms. 80% of the latter said they adopt the paradigm promoted by the Ecuadorian educational reform; paradoxically, they couldn't remember the name of the driving theory. Even though, 55% of the participant teachers has been linked to programs for continued education (no training the rest) the majority of them (89%) did not have any previous experience with ICT or computers, 11% stated they have medium to high experience in the use of office-support software.

In the school context, an average of 50 students per classroom was found. One out of the twenty schools (2.5%) had computers; but, very outdated ones (no hard disks). Computers are used in administrative tasks and/or for academic usage. The latter includes technology as another subject in the curriculum and does not integrate it as part of the whole curriculum. Only two teachers have computers at home and the reference material is the one chosen by principals or the designated by the Educational Ministry.

According to the chosen answers in the second survey very high indexes over 5 were reached for each of the set of activities. On the behaviorist, cognitivist, and constructivist sets the averages were 3.56, 3.76 and 4.16, respectively see [Figure 1].

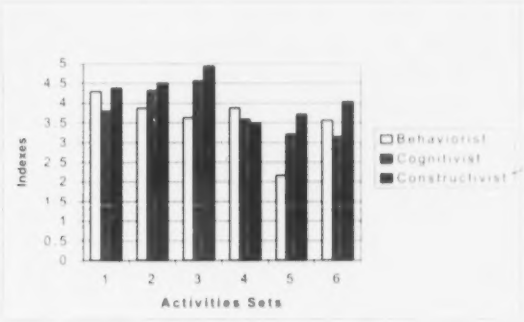

Figure 1: Activities indexes, categorised by Learning Strategy

Next the researchers interviewed the educators in order to find reflexive and coherent answers according to the survey results. Unfortunately, only one of the interviewed teachers where more coherent with the results obtained in the surveys and the paradigm he promoted in classroom. Teachers could not explain why they chose some activities completely opposed to other ones, or from complete different approaches.

Class Observations and Video Analysis

This data source provided the researchers with important evidence referred to the learning paradigm the Ecuadorian teachers adopt. The videos were analysed focused in the following type of activities: (1) behaviorist-related activities, (2) cognitivist-related activities, and (3) social – constructivistic related activities.

Teachers adopted most of the times the central role in the classroom, promote individual activities, rely their activities in concept definitions, drill and repetition. They neither foster the use of other sources of information nor bring past experience to the classroom. Group-based learning is almost avoided due to the high number of students in the classroom, and when used the group community does not exist, all you can see is agglomeration of children trying to solve a problem in a very unguided way. Since, the teacher remains in front of the class instead of supporting kids in their tasks. This latter is aggravated with the lack of enough material to make all the students engaged in specific activities. The developing of project based-activities is neglected, since in their words "there is no time or resources to promote that kind of ideas." Finally, teachers still consider children as repositories of information and not as possible self-regulated or reflexive subjects able to construct their own knowledge.

Analysis and discussion

This analysis will be unfolded in two topics: the educational model adopted by Ecuadorian teachers and the educational and technological needs of these educators.

The Ecuadorian educational model

The results obtained with surveys greatly contrasted with the ones obtained from interviews and much more with the video analysis of classroom's activities. According to the surveys more than the 50% of the teachers have participated in continuing education proposed by the Ministry of Education it would be reasonably to find well-prepared teachers executing a practice in-line with the model the educational reform promotes. But, what researchers found supported by the use of qualitative and quantitative data analysis was a very contrasting reality. Teachers performed a more behavioristic class than a constructivistic one and self-categorised themselves as a mix of behaviorist and constructivist educators (44%).

Educational and technological needs

Teachers from the Peninsula region suffer from a clear weakness -they do not have a deep understanding of the pedagogical paradigm the educational system urges them to adopt. They keep considering students as receivers of information whilst the cognitive and social construction of knowledge is almost neglected; since, the memorisation of content tends to be the primary source for evaluation and educational success. They do not reflect on their educational practices. Ecuadorian educators follow the textbooks the system suggests, they remain as the basic unit of instruction, and few of them refer their students to other information sources. Teachers make efforts to work in a group-based learning approach; nevertheless, their practices do not reflect planned and organised tasks with specific goals to achieve in the classroom setting. They adopt in this a pragmatic and empirical attitude. Therefore, they need a program where they learn the following:

To centre their teaching practice on the learner
To redefine their teaching role as facilitators or coaches in the classroom
To promote the construction of knowledge in view of the social context of pupils and teachers in the Santa Elena Peninsula area.
To develop abilities to work with computers and the programs the project adopted.
To promote self-reflection and critical thinking

Conclusions

The focus of this study was to identify the common educational characteristics of the Ecuadorian coastal rural teachers, specifically the teaching - learning strategies adopted and promoted by these teachers. Besides, the description of the characteristics of the educational context where the educators develop their activities was other of the goals of this study and the identification of the educational and technological teachers' needs. All the goals were achieved successfully. Evidence that the teachers of the Ecuadorian coastal region are not upholders of the social – constructivistic paradigm is the fact that they obtained high rates in all three categories of teaching-learning strategies studied. Teachers do not have a deep and thorough understanding of what they mean by being constructivistic, since they could not explain their performance over what they answered during the surveys and interview sessions. They do

not reflect on their educational practice and/or use a specific frame of reference. Qualitative data analysis in this study was the key in these latter findings.

In regards with the educational and technological needs of these teachers, the researchers found the educators needed a program in which they learn to be social-constructivistic teachers; since, they are not able to promote strategies they do not understand. The researchers find the teachers have to have opportunities to share with others their successes and failures in order to learn with and from others; thus, workshops, conferences and reflective practice have to be encouraged for the quality of teaching – learning in the project. Finally, the IESEP team has a major challenge, teachers have to learn while getting involved in what is significant learning for them, they will learn more efficiently by doing or experiencing (Davis, 1998). Unless what is learned can be applied to actual work or life situations the learning will not be effective or long lasting.

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Critical Kiwi Chronicles:Technology and Teacher Education in New Zealand

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Abstract: This paper provides a critical analysis of the integration of technology in pre-service teacher education in New Zealand. New Zealand has made great strides in reforming curriculum both at the pre-college and teacher education levels. As a result, the country has decided that technology has a vital role to play in the teaching and learning process. As a result teacher education institutions have made great strides in course development, online offerings, and internet resources for prospective teachers. The issue is the continued professional development of teachers and actual application of technology in the schools.

Introduction

Technology and teacher education in New Zealand are undergoing considerable transformation. Unlike the United States, which remains in the grips of societal debate regarding even the very basic goals of education, teacher education, and the role of technology within each, New Zealand has a established a decided direction for technology in education and teacher education. The history of teacher education in New Zealand is not without controversy and domination by traditional praxis. Specific issues unique to New Zealand teacher education include the role of New Zealand in the world, relations with other nations, Maori and bicultural issues, the recent debate over the curriculum documents, the overarching goals of teacher education for transmission or transformation, and the role of technology in education and teacher education.

The history of teacher education has traditionally been conducted by teacher's colleges which have been separate from the university system. As a result, one finds most of the faculty with only bachelors or masters degrees, and many who are still teachers in local schools. Students enter colleges of education immediately after finishing secondary schooling. The three year program includes both content specific courses that are directly tied to content the prospective teachers will be teaching. Students are also required to take the pedagogy courses at the same time. School placements occur during each of the three year program. The focus is to provide placement early on and build on length of placement throughout the experience. There is no semester-long student teaching although students have lengthy placements during the last year in the program. Issues with placements seem to be a lack of organization, lack of relevance (context and connections), and saturation of the schools.

Issues

Technology in schools and teacher education in New Zealand is definitely supported by the ministry of education and the universities themselves. Schools receive funding for technology integration and every school in has at least one internet connection. One also finds at least one fairly new computer in every classroom. There are web sites and online support for teachers interested in technology integration in their classrooms. The issues of standards for technology within education and teacher education are again debated here.

Very similar issues exist in New Zealand as in the U. S. regarding integration of technology in education. These issues include access, support, funding, and "training." Teacher education institutions offer undergraduates one course on computers in education and students can take others as electives. Very little technology integration is included in other face to face teacher education courses. It is generally left to the individual faculty member to decide for themselves. Recent literature reinforce the issue that in general

future teachers are not receiving the experience needed to effectively integrate technology in teaching and learning both in the U. S. and in New Zealand (Moursund and Bielefeldt, 1999; Hunt, 2000).

New Zealand is grappling with the issues of technology and standards and many provide a critical response to the technology "by in" by schools, education, and teacher education. A critical understanding of ideology and the social practice of technology leading to an equitable distribution of resources and power should be discussed (Hilty and Gitlin, 1996; Snook, 2000). Brown (2000) suggests that without critical knowledge of pedagogy and a philosophical framework for application in one's own teaching and learning, critical reflection in teacher education, educational technology, and schools is highly problematic.

Perhaps because of the rural nature of the country, New Zealand has made great strides in online course development for teacher education. New Zealand rivals the U. S. in per capita internet usage, thus meeting the needs of students via distance education is a particular directive from the Ministry of Education and colleges of education. As a result, many courses are offered as online alternatives with Webct as the chosen software. In fact, only this year the first totally online cohort in teacher education graduated from Massey University (they did engage in traditional school placements however).

It does seem that recent efforts in technology and teacher education have gone toward online course development rather than integrating technology in teaching and learning in the schools. Massey University has excellent support for online courses. Faculty receive extensive opportunities for professional development and technology support. The university has also established Webct templates to make it easier to get up and running with online courses. The online course office establishes accounts for faculty and students, manages the sites, coordinates all mailing, and even has established general discussion forums and online help sites for addressing issues and concerns. The university web site has all kinds of links to assist faculty, staff, and students with online courses and technology integration.

There is a concerted effort throughout the country to improve information and communication technology (ICT) for prospective teachers. Massey University for example, has established a "knowledge net" metaphor outlining principles of preservice teacher education and technology knowledge and skills for classroom application. The idea is that teaching learning and technology include linking to innovative teaching, be understood as social practice, be located in meaningful contexts, be infused throughout the curriculum, and be integral to lifelong teacher professional development (Brown, 2000).

Perhaps New Zealand is at a crossroads and what really is accomplished regarding schooling, education, and technology integration depends on teacher education, professional development, and eventual application of ideas in the classroom. There is no doubt that there have been efforts made by the ministry in improving education, teacher education, and technology integration within each, but it remains to be seen whether the curriculum documents and teacher education changes will make a difference for the future in New Zealand.

Conclusions

In summary, many similarities exist regarding schooling, education, and teacher education in New Zealand and the U. S. In both nations schooling, education, and teacher education have suffered from inconsistencies dealing with definition, purpose and rationale, and approaches. Curriculum, instruction, and assessment issues are also prevalent in both societies. Perhaps the most important issue has been the continued focus on traditional rather than transformation praxis in teacher education. These issues make for problems as New Zealand attempts to improve teacher education in the new millennium.

Skelton (1997) suggests that there is a desperate need to transform education and teacher education so that the goal is to encourage respect for different perspectives, uncertainty, and provisionality as preparation for living in a increasingly pluralistic, fragmented, and rapidly changing world. Powerful approaches including meaningful, integrative, value-based, challenging, and active teaching and learning are needed to transform both schools and teacher education (Hope, 1996). Likewise, the potential for technology as a tool for transforming schools, education, and teacher education can not be denied (White, 2000).

The real future of schooling, education, teacher education, and technology integration in New Zealand has yet to really be determined. Despite the mandated curriculum documents, there remain entrenched educators, administrators, teacher educators, and others in society bent on ensuring the maintenance of the status quo and traditional teaching and learning, even with the use of technology. As is its history, schooling, education, and teacher education internationally will always be the center of educational debate. New Zealand is no different on this account. But the potential for a transformative

schooling, education, teacher education, and technology integration has at least experienced positive hope in New Zealand.

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